ACT | ASSESSING LOW CARBON TRANSITION

ADEME
Agence de l'Environnement et de la Maîtrise de l'Energie

CDP
DRIVING SUSTAINABLE ECONOMIES

CONTENTS

ABOUT THIS REPORT

This is the full report of findings from the ACT pilot project. It includes a detailed account of; Introduction to the project and its approach, findings from the development of three sector-specific methodologies for each ACT module, a reflection on the development process and outputs, and an indication of the next steps for ACT. The ACT framework and the three pilot methodologies are also freely available online, alongside comments received during consultation and the report of the quality assurance process on the pilot project.

Companies are central to the transformation of society and have a key role to play in the transition to the low-carbon economy. Conscious of the current paradigm shift and desiring to play a role in it, thousands of companies mobilised during COP21 to make robust commitments to reduce their greenhouse gas emissions and to transform their business model.

To continue to move forward and adopt increasingly ambitious long term emissions pathways, putting us on the path towards 1.5/ 2ºC, in the spirit of transparency and trust that characterised the Paris Agreement, it is essential we are able to assess the credibility of corporate climate strategies and the consistency of their commitments. This is what ACT's holistic and sector-based assessment methodologies offer. This remarkable and highly promising tool, deserves that as many companies as possible adopt it, implement it and refine it, for it to eventually become a real driver of change.

Laurence Tubiana
Climate Champion

1 Introduction and approach

Climate change will have a transformative effect on the economy. As the dominant force in the global economy, corporations will have to choose what role they play in this transformation.

With rising global emissions and more international consensus to tackle the problem than ever before, efforts to mitigate climate change will transform the global economy. There will be winners and losers from these transformations, both among companies and from those who invest in them. While many large companies readily state that they will continue to profit in the low-carbon economy, robust ways to check to what extent companies are truly ready for the transition have been lacking. This is the gap that the Assessing Low-carbon Transition (ACT) methodologies seek to fill.

Large businesses are the dominant force in the global economy, and will therefore have to choose what role they play in the transition to a low-carbon economy. A company can either chose to become an agent of change, or pursue a "business as usual" approach that avoids change in the short-term, but exposes themselves to the resulting long-term changes in their operating environment.

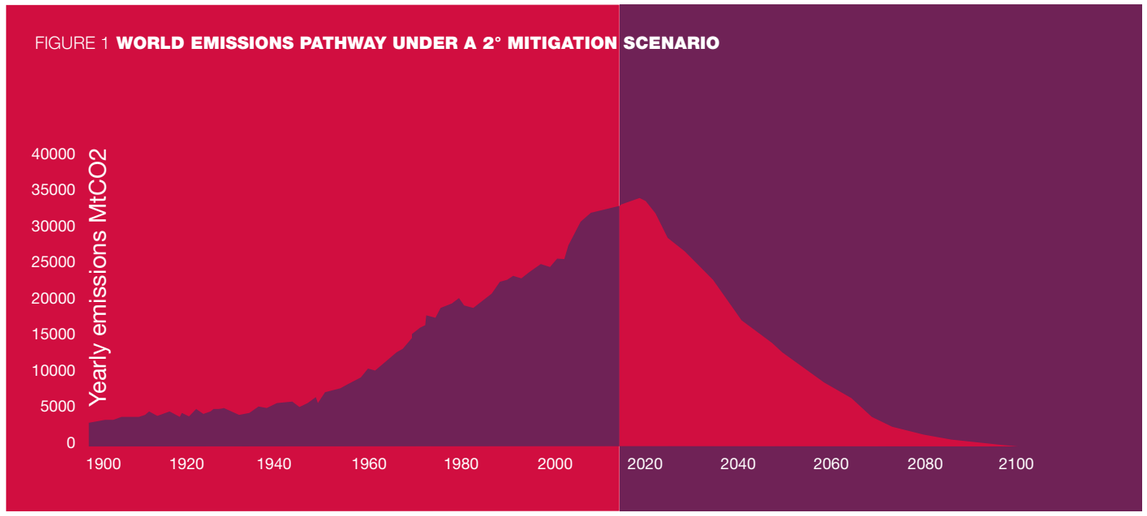
The Rio Earth summit in 1992 marked the start of the widespread adoption of corporate commitments on climate change. The intervening years have seen a proliferation of commitments by companies, and the development of entirely new fields of expertise to help companies measure, manage and reduce their GHG emissions. Alongside this, climate change science has become more advanced, with a high degree of clarity around the contributions different industrial sectors have to make to stay within the global emissions budget. We can therefore say with more certainty than ever before what the emissions budget of a specific company is, and what strategic actions the company must take to stay within this budget. This has allowed the differentiation between companies at varying stages in the transition to the low-carbon economy.

ACT comes at a time with more urgency than ever to act on climate change, and more certainty than ever that effective mitigation action is required. However, as shown by CDP's annual reports, practices in accounting and disclosing GHG emissions are different from one company to another, and global emissions are still growing despite companies' commitments. Figure 1 illustrates that CO2 emissions have increased by 1000% during the last century. In many scenarios, the ability for a company to transition requires a complete change of business model away from the fossil-fuel based systems that the economy has been built on for centuries. At the 2015 United Nations Climate Change Conference (COP21) in Paris, a global binding agreement to limit dangerous climate change was reached. The political consensus is that warming should be limited to well below 2 degrees above pre-industrial levels, with parties agreeing to pursue efforts to limit the temperature increase even further to 1.5ºC. One new feature of the Paris climate change conference was its increased level of recognition that the private sector, including businesses and investors, will have a role to play in helping the world reach its climate change mitigation goals. Businesses and investors, for their part, are increasingly willing to play a more active role in global efforts against climate change, recognizing that ultimately climate change also threatens their ability to function. The Action Agenda initiative saw many hundreds of commitments on climate change by organizations including companies and investors made public in the run-up to Paris.

The ACT methodologies will bring a new layer of accountability to business commitments by assessing the present willingness and ability of companies to dedicate themselves to a low-carbon future. ACT assessments take a holistic approach; taking into account both quantitative and qualitative indicators that can provide insight on a company's current and future ability to reduce their climate impact. The information gathered is consolidated and used to provide a rating that represents a company's alignment with low-carbon transition.

ACT methodologies are sector specific, because the contributions different sectors make to global emissions differ greatly, and different actions will be required of different sectors as they play their part in the transition to the low-carbon economy. Three sectors were chosen for initial methodology development: electric utilities, auto manufacturing, and retail sectors. These were chosen for the pilot as they typify a range of challenges companies will face during the transition to the low-carbon economy. The approaches developed for these sectors during the pilot will be applicable to other sector methodologies in future.

FIGURE 1 **WORLD EMISSIONS PATHWAY UNDER A 2° MITIGATION SCENARIO**



2

ACT, the accountability layer of climate action

ACT methodologies build on the ladder an organization follows towards reducing GHG emissions; measurement, transparent reporting and making public commitments to mitigate climate change. As highlighted in Figure 2, ACT adds a new layer of accountability to these established steps, and uses them as a foundation whilst also integrating these practices into the ACT methodologies themselves. These practices have developed over time and build on one another, and they also mark specific steps a company goes through when setting out to reduce its climate impact.

MEASUREMENT

Measurement is the first step to reducing environmental impacts, on the basis that 'what gets measured gets managed'. A complete inventory of GHG emissions helps organizations understand their emissions profile and identify opportunities for emissions reduction.

The first step in any GHG reduction plan is to measure and create a baseline of what current GHG emissions are for an organization. National and international standards for measuring GHG emissions, including Bilan Carbone ®, the ISO 14064 suite of standards, and the GHG Protocol, have been under continuous development since the early 2000s. Without accurate and comparable measurement methods, companies cannot identify opportunities for reduction, benchmark their progress against each other, and track reductions made in emissions over time. Accurate measurement is also critical for ACT methodologies, or indeed any assessment methodology, as it forms the basis for accurate assessment and comparison. The development of international standards and the body of practice and tools to help their implementation has been critical to companies gaining a clear understanding of their emissions, and has opened up the possibility of regulatory incentives for climate mitigation, such as cap and trade schemes and carbon taxes.

TRANSPARENT REPORTING

Transparent reporting consistent with climate standards is essential to achieving a low-carbon economy. Stakeholders can hold transparent organizations accountable for their performance, and sharing information brings opportunities to collaborate along the value chain. Both effectively reduce climate impact.

Once an understanding of GHG emissions has been gained, then companies may report their annual GHG emissions in some way via a voluntary reporting scheme, or in some geographies be required to report as part of a regulatory one. Transparency on GHG emissions is the first step towards developing shared accountability for reducing them. Stakeholders can hold companies accountable for the GHGs they emit, and transparency allows investors to compare companies and provides the opportunity to make more climate-friendly investment decisions. Finally, exposing data to external scrutiny is a powerful incentive for companies to ensure that it is accurate, so transparency can also drive improvements in data quality. While the ACT pilot was private and information disclosed to the project team by companies during this phase is confidential, the assessment also takes into account publically available data reported voluntarily by companies. Such publically disclosed information is assessed to be more reliable due to the accountability which transparency brings. Transparent reporting has laid the foundation for ACT both as part of its intellectual framework and as a source of information for assessments.

FIGURE 2 **LADDER FROM MEASUREMENT TO ACCOUNTABILITY**

PUBLIC COMMITMENTS

Public commitments provide a clear sense of direction to an organization and its stakeholders. Setting science-based targets and defining the appropriate means to achieve them lays out the pathway to meaningful climate action. Once companies have prepared a baseline of GHG emissions data and are reporting it transparently, the next step is to reduce these emissions, or to mitigate climate change in other ways.

The creation of GHG reduction targets provides clarity of purpose to the employees within an organization. This allows for realistic and achievable plans to enable emissions reduction whilst maintaining business performance. More companies and investors are now committing to leadership on climate action than at any time in history. One alliance is We Mean Business, which is a coalition of environmental organizations that encourages companies to commit to initiatives. These initiatives range from the adoption of science-based emissions reduction targets to the removal of commodity-driven deforestation in supply chains. These commitments are automatically fed into NAZCA (Non-State Actor Zone for Climate Action), a global platform that brings together the climate commitments to action by companies, cities, subnational regions, investors and civil society organizations. Both transparency and public commitments are prerequisites to the concept of shared accountability which the ACT project has identified as critical to reducing carbon emissions in the economy.

ACCOUNTABILITY

Accountability is needed to ensure the commitments of companies deliver the low-carbon economy. ACT assessments use climate scenarios to define the specific level of ambition required for each sector. The ACT assessment process checks the organization against this science-based benchmark to produce the ACT rating.

The ACT methodologies aim to shed light not just on whether company commitments are adequate and on track to be met, but whether broader company performance on reducing emissions is on the correct pathway. The assessment looks at recent actions, current performance, and uses information on this and the company's strategic future direction to predict their future climate performance. This is vital to verify individual corporate contributions and commitments to climate change mitigation, and to emphasize the urgency with which we need to act globally to mitigate climate change. There is need for a globally relevant and comparable system to hold multinationals accountable to their contribution to the global target of keeping global warming well below 2 degrees as stated in the Paris agreement. The main goal of the ACT assessments is to find out which companies – between now and 2050 – are best positioned to successfully transition to the low-carbon economy, and to provide feedback to companies which are not, and identify the gaps and challenges that need to be overcome to improve alignment.

2.1.1 THE CASE FOR ACCOUNTABILITY

Since the reputational benefits of making public commitments to reduce emissions accrue to companies as soon as they make them, there is a danger that companies can simply make commitments and then fail to meet them, whether by design or by omission. There is then no GHG reduction benefit gained, or the benefit gained is less than it should have been. There is also the question of whether such commitments are appropriately scaled and relevant to the challenges climate change poses to that particular company: While replacing 100% of lighting systems with efficient LEDs is laudable, for a company such as an electric utility operating coal fired power plants such efforts will have little material impact on GHG emissions overall, and are wholly inadequate to the decarbonization challenge of the sector. The mismatch is there both in the amount of CO2 that will be reduced by the action, in proportion to the carbon budget such a company needs to operate within, and the type of mitigation action chosen and its relevance to the key emissions sources of the company.

Another challenge of commitments is timescale. Emissions reductions are needed continuously over a long timeframe – to 2050 if we benchmark against most global climate scenarios - which can be a challenge to companies operating with the need to post annual profits in mind. This can cause a mismatch between the operating timescale and the timescale of target delivery. It's not uncommon to see politicians make grandiose long term commitments on timescales much longer than their term of office, aware that they will never be held to account for delivery, and then fail to take any steps toward implementation. The same moral hazard can occur for companies. Targets must therefore strike a balance between catalyzing immediate action and ensuring that action is maintained over the medium and long term.

Commitments alone, then, do not guarantee action, nor do they assure that the action committed to by the company will be appropriate in terms of materiality, scale or timeframe. What is needed is an accountability mechanism, providing feedback to the actors in the economy, on whether the actions and commitments a company is making on climate are the right actions, whether they are set at the right level, on the right timescale, and whether a company is on track to achieve them. Without such a feedback mechanism there is no way of knowing if a company is playing its part to achieve the emissions reductions needed to mitigate dangerous climate change. Such knowledge is vital for the decision-making of various actors; investors, anxious to understand which companies will continue to profit in the low carbon economy; government and international agencies wishing to know if national and international efforts to mitigate climate change are on track; and companies themselves wanting to understand and improve their own performance, or those of their partners and suppliers.

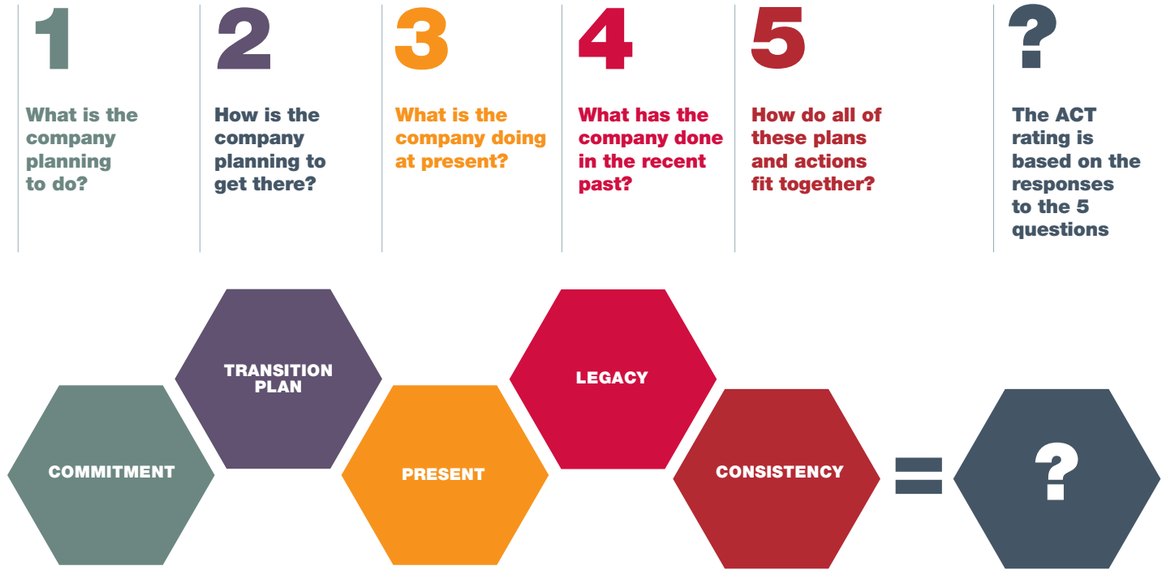
2.1.2 ASSESSING LOW-CARBON TRANSITION

No-one knows what will happen in the future, but what we know about the present and recent past allows us to make predictions about it with varying degrees of certainty. Since the 2050 horizon that climate scenarios dictate is relatively distant in terms of some company operations, predictions become more uncertain as we near this date, but are not impossible to make. Creating a systematic framework allows us to take a consistent approach to assessing the future.

ADEME and CDP partnered with 2DII, EIB and ClimateCHECK for the ACT pilot project, which from launch at COP21 in Paris developed 3 methodologies to assess alignment with low-carbon transition in the Electric Utilities, Auto Manufacturers and Retail sectors. Methodology development was done in consultation with companies and experts in these sectors, and pilot companies reported against the methodologies and received an ACT pilot assessment and rating in confidence.

ACT methodologies will allow investors to identify which companies are ready for low-carbon transition; they will allow companies to benchmark their own progress and identify what actions they need to take; and they will allow program operators, such as government agencies, to identify which companies are worthy of recognition and ready to fully play a role in helping a country meet its intended Nationally Determined Contributions (INDC's).

FIGURE 3 **ACT ASSESSMENT FRAMEWORK**



ACT FRAMEWORK

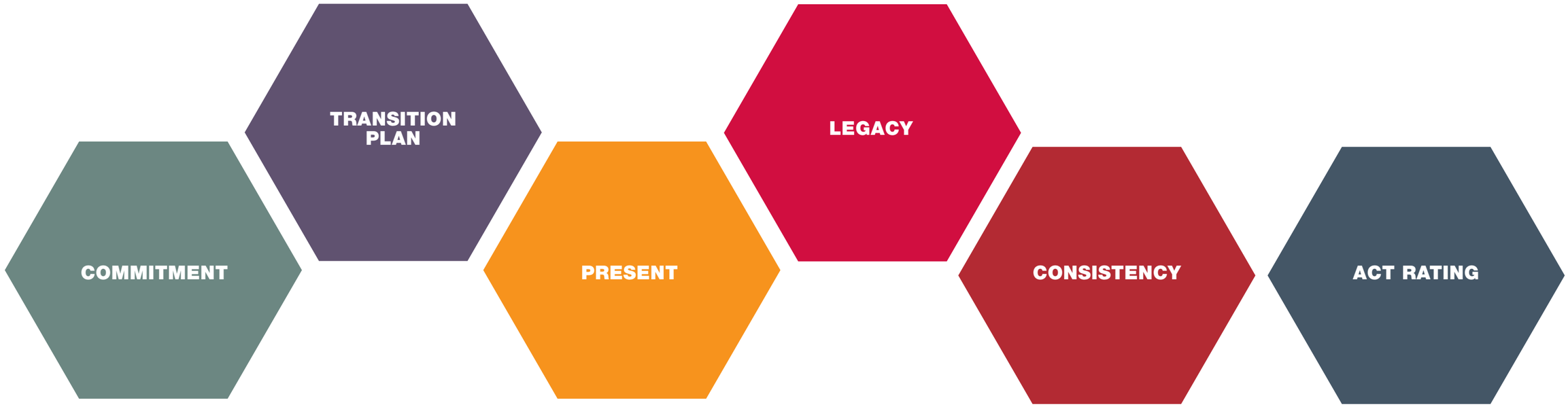
As a starting point the ACT methodology developers posed five guiding questions about company alignment with low carbon transition to 2050. The five questions became the basis of a framework to steer the development of the ACT methodologies;

- What is the company planning to do?
- How is the company planning to get there?
- What is the company doing at present?
- What has the company done in the recent past?
- How do all of these plans and actions fit together?

By relating these five questions to the information available on a company's investments, actions, and strategy, a set of indicators were developed for each sector to benchmark a state of alignment with low-carbon transition, and measure how far away companies are from that state. The complete set of ACT indicators is listed in each sector methodology, along with the rationale for their inclusion, guidance on how to report against them and details of how they will be assessed.

The framework remains the same for development of each methodology, but indicators are a mix of sector-specific and common elements, and the weighting given to each indicator varies across the sectors. This reflects that different sectors have different sources of emissions, and different actions to take to transition to the low-carbon economy. A table summarizing the indicators in each sector methodology is available on page 30 of the report.

2.2 THE ACT FRAMEWORK



Has the company committed to a low-carbon future vision?

Are its emissions reduction targets ambitious enough to get there?

How quickly is it planning to act?

Company commitments are assessed using the Sectoral Decarbonization Approach (SDA). This is a methodology developed to derive company-specific decarbonization pathways from global low-carbon scenarios. Within ACT, the SDA methodology was further developed as necessary to account for geographical differences within climate scenarios, and to allow for the assessment of specific targets on subsets of company emissions.

Specifically, emissions reduction targets are checked to see if gaps exist between the trajectory the company has committed to, and the benchmark trajectory. Not only the ambition level, but also the timescale of these reductions is assessed.

Does the company have a transition plan to achieve its low-carbon vision?

Will it drive the evolution of the business?

Transition planning is an important evolution of strategic environmental planning, by detailing the important choices that have to be made to transform the company, and mapping out the pivot points in the company's operations that move it towards a low-carbon business model. Scenario analysis and stress testing are important steps to gain the required understanding to do this.

A correct implementation of transition planning lays out the trajectory that the company has to take in terms of emissions, and then interprets that trajectory with the company's most relevant operational outputs and processes in mind.

Does the current company strategy lead to a decrease in emissions in the short-term?

Are investment decisions today made with the long-term future in mind?

Looking at the present provides the most certain picture of company performance, and choices made now will continue to have an impact on emissions for some time to come. Cars sold today will be on the roads for ten years or more, and power plants opened recently will continue to operate for many years, with significant influence on the company's future emissions outlook.

Management decisions on engagement with policy makers, and governance aspects like incentives and levels of knowledge at the board level will have consequences for overall company impact on climate change, so they are considered as part of the holistic ACT assessment.

How do the business decisions made in the past influence the company emissions trajectory?

Past performance does not predict future performance. However, we cannot get a full understanding of a company's transition to the low-carbon economy without looking at their recent performance on climate action.

Experience reducing emissions in a company's own operations can indicate that lessons have been learned about successfully managing a GHG reduction program. Recent action to reduce emissions intensity will translate into a less challenging transition to the low carbon economy overall.

Is the business strategy consistent with emissions reduction targets?

Do any business activities undermine the company's ability to reach a low-carbon future?

The final step in the ACT Framework is to holistically consider all information and indicators gathered previously to analyse the consistency between the various elements of the company's business strategy and operations. ACT scans all the available data to see whether a company is being consistent in the application of its low carbon transition plan, and is transforming its business in line with their objectives.

Companies can also engage in a wide range of activities, inside or outside of their core business, which could help or hinder their ability to transition to the low-carbon economy. These activities may be out of scope for the boundaries of the used methodology but still cannot be seen as disconnected from the company's overall score.

All information is combined into the three-part ACT rating, that includes a performance rating, an assessment rating and a trend score. Please see chapter 3 for an elaboration of the different rating elements. This rating communicates the low-carbon alignment of the company.

2.3 ACT PILOT PARTNERS

Leading partner: ADEME
ADEME is the French State agency supporting environmental and energy transition. ADEME provides businesses, local governments, public authorities and the general public its expertise and advisory capabilities to enable progress towards an environmental transition.

Leading partner: CDP
CDP works to transform the way the world does business to prevent dangerous climate change and protect our natural resources. It has pioneered the only global natural capital disclosure system where over 4,500 companies, representing over 50% of the market capitalization of the world's largest 30 stock exchanges, and 110 cities from 80 countries, report, share and take action on vital environmental information.

Verification partner: ClimateCHECK
ClimateCHECK are experts on assurance and standards for climate, cleantech and sustainability. To support the transition to Standards 2.0, ClimateCHECK developed the Collaborase online platform engaging over 5000 of experts from around the world in next generation standards systems. ClimateCHECK also co-founded the GHG Management Institute as the world leader for training and capacity building on GHG MRV with over 7000 of members in over 150 countries.

Partner: 2DI
The 2° Investing Initiative is a multi-stakeholder think tank working to align the financial sector with 2°C climate goals. Our research and engagement activities seek to:

- Align investment processes of financial institutions with 2°C climate scenarios;
- Develop the metrics and tools to measure the climate performance of financial institutions;
- Mobilize regulatory and policy incentives to shift capital to energy transition financing.

The association was founded in 2012 in Paris. In 2015 it counts two legal entities based in New-York and Paris and one office in London. 2°ii carries projects in Europe, China and the United States. Our work is global, both in terms of geography and engaging key actors. We bring together financial institutions, issuers, policy makers, research institutes, experts, and NGOs to achieve our mission. Representatives from all of the key stakeholder groups are also sponsors of our research.

Partner: EIB
As the EU bank, the EIB provides long-term finance for sound, sustainable investment projects in support of EU policy goals in Europe and beyond. Owned by the 28 EU Member States, the EIB is the largest multilateral lender and borrower in the world. The Bank has over 3000 staff who can build on over 50 years of experience in project financing. The EIB is headquartered in Luxembourg and has a network of over 40 local offices.

2.4 PROJECT STRUCTURE

In addition to the project partners guiding methodology development and outlining the principles and framework for development, the ACT methodologies had input from a range of stakeholders via the Technical Working Groups, Advisory Group and public consultation. Feedback received from these sources influenced the ongoing development of the methodologies and consultation feedback was taken into account in both the final published versions and the suggestions for future methodology development.

TECHNICAL WORKING GROUPS

A technical working group (TWG) was convened for each sector, consisting of companies in the sectors and selected industry experts. After each stage of methodology development, progress was presented to the group via webconference to enable discussion and feedback. TWG members also had the opportunity to comment (publicly or anonymously as desired) on the emerging methodologies via an online consultation platform.

TECHNICAL WORKING GROUP FUNCTION AND PURPOSE

A technical working group was assembled for each sector. Members were specialists in climate change and/or sustainability reporting from within companies in the sectors; climate change experts specialising in the sectors in question; and investment analysts specialising in climate change and/or the sectors in question. The function of the technical working group was to advise on the development of the methodologies, review the work of the methodology developers, and ensure that the resulting methodology could be implemented in practice. It also ensured that key issues of climate change within each sector were addressed by the methodology. Companies participating in the technical working groups committed to report against the methodologies developed and receive an assessment. All participation was on a voluntary basis.

Members of the technical working groups were recruited from the organisational contacts of the project partners. As a government agency working with companies, investors and other experts, ADEME had a significant contact base in France. CDP works globally with around 10,000 companies and investors and could leverage contacts globally to recruit members. All project partners pooled expertise and approached peer organisations to identify experts not attached to companies who could add to the technical working group.

TWG meetings were held every 4 – 6 weeks over the methodology development process, via web-conference. Due to participants residing in different time zones it was not possible to find times that suited every member, but times were alternated to try and increase coverage. At each meeting the current status of the methodology was reported on for question and discussion by the group. Drafts of the methodology were circulated in advance of the meeting once the methodology development process was underway. In addition to the meetings, the emerging ACT framework and methodologies were shared online via the Collaborase online consultation system to allow review and comment at the participants' leisure. Documents were also circulated in electronic copy by email, and the project team stressed their availability for one-to-one feedback by email or telephone (although this was not widely utilised by the participants).

ADVISORY GROUP

An advisory group was formed of representatives of commercial and non-profit organizations and agencies working in the field of climate reporting. The advisory group was invited to comment on and review the methodologies via webconference and online at each stage of development.

PUBLIC CONSULTATION

The methodologies were made available for public comment from September 2016 – January 2017 via an online platform, and the consultation was publicized via relevant sustainability reporting networks and the project partners on social media. The response rate was encouraging and the comments received were notable for their quality.

3 ACT method

Climate change will have a transformative effect on the economy. As the dominant force in the global economy, corporations will have to choose what role they play in this transformation.

With rising global emissions and more international consensus to tackle the problem than ever before, it is clear that efforts to mitigate climate change will transform the global economy. There will be winners and losers from these transformations, both among companies and from those who invest in them. While many large companies readily state that they will continue to profit in the low carbon economy, robust ways to check to what extent companies are truly ready for the transition have been lacking. This is the gap that the Assessing Low Carbon Transition (ACT) methodologies seek to fill.

3.1 PRINCIPLES

The application of principles is fundamental to ensure that Low Carbon Transition-related information is true and fair. The principles are the basis for, and will guide the application of, the requirements in the present methodology.

Relevance: Select the most relevant information (core business and stakeholders) to assess low carbon transition.

Verifiability: The data required for the assessment shall be verified or verifiable.

Conservativeness: Whenever the use of assumptions is required, the assumption shall err on the side of achieving 2 degrees maximum warming above pre-industrial levels.

Consistency: Whenever time series data is used, it should be comparable over time.

Long-term oriented: Enable the evaluation of the long-term performance of a company while simultaneously providing insights into short- and medium-term outcomes in alignment with the long-term.

The ACT pilot project integrates 5 core key principles into its framework that are based from 3 reputable organisations: sustainability ratings (GISR); sustainability standards (ISEAL); and standards in general (ISO). As these organisations encompass a wide variety of principles, only the complementing principles that are related to the ACT methodologies were chosen. Thus, it was not attempted to map the entire principle space within the many sustainability standards there are. Many of the principles do overlap or match with other principles already considered.

The methodology developers decided that a ‘less is more’ approach was appropriate to choose principles. Many principles could be formulated and make sense in the context of ACT, but the principles that were chosen were those which were most likely to influence key decisions. For example, the conservativeness principle influenced a lot of key decisions by helping decide on which end of an uncertainty range the scoring system should position itself. Time restraints and practicality prevented the methodology developers from enlarging the scope for methodological development principles much further, so focus was limited to the 3 reputable organisations outlined. Moving from the specific to the generic, it was possible to attain sufficient coverage of usual practice in the adoption of principles to guide standard development.

3.2 ACT RATING

The ACT rating combines quantitative and qualitative information on a company’s past, present and projected future to reveal its alignment with the low-carbon transition

The ACT rating consists of three elements:
1. A Performance Rating, represented as a number from 1 up to 20
2. An Assessment Rating, represented as a letter from A down to E
3. A Trend Rating, represented as +, improving; -, worsening; or =, stable.

Each responding company in the ACT pilot project received not only an ACT rating but a commentary on their performance across the three aspects of the rating. This gave a nuanced picture of the company’s strengths and weaknesses. Detailed information on the ACT rating is available in the ACT methodologies.

THE HIGHEST AVAILABLE ACT RATING IS 20A+

- **A performance rating of 20: the company received high scores in its assessment against the methodology indicators.**
- **An assessment rating of A: the information reported by the company and available from public sources was consistent and showed that the company is well aligned to transition to the low-carbon economy.**
- **A trend rating of +: the information provided shows the company will be better placed to transition to the low-carbon economy in future.**

ACT PILOT ASSESSMENTS

A number of the ACT pilot companies reported against the ACT pilot methodologies and went through the ACT assessment process, receiving a confidential ACT rating and feedback on their performance. Since pilot reporting was confidential, individual company results will not be made public. Although the number of reporting companies was not a large enough sample to draw conclusions on the performance of these sectors as a whole, it enabled a thorough trial of the methodologies and assessment process. This report reveals observations on the aggregate performance of the responding companies from the assessments.

FIGURE 4 **ACT WEIGHTINGS PRINCIPLES**

PRINCIPLE	EXPLANATION
VALUE OF INFORMATION	The value of the information that an indicator gives about a company's outlook for the low-carbon transition is the primary principle for the selection of the weights.
IMPACT OF VARIATION	A high impact of variation in an indicator means that not performing well in such an indicator has a large impact on the success of a low-carbon transition, and this makes it more relevant for the assessment.
FUTURE ORIENTATION	Indicators that measure the future, or a proxy for the future, are more relevant for the ACT assessment than past & present indicators, which serve only to inform the likelihood and credibility of the transition.
DATA QUALITY SENSITIVITY	Indicators that are highly sensitive to expected data quality variations are not recommended for a high weight compared to other indicators, unless there is no other way to measure a particular dimension of the transition.

3.2.1 PERFORMANCE RATING

The performance rating, which ranges from 1 to 20, is the main output of the ACT indicator framework. The performance score is the weighted average of all indicators that are developed for a particular sector. As the score is numerical, all input scores from the indicators also need to be numerical. There are several different methods to interpret quantitative and qualitative data to come to a set of numerical output values that can be weighted and consolidated into the performance score.

Not each indicator is equally important for the end goal of understanding transition readiness. Each indicator module and individual indicator has a separate weight that is determined per sector. The selection of weights for both the modules and the individual indicators was guided by a set of principles. These principles helped define the value of the indicators.

In some cases, indicators might be identified as very relevant but be difficult to assess. These cases might occur in the following circumstances: lack of maturity of the methodology (e.g absence of scenario/benchmark), difficulties in collecting information, or difficulties in verifying collected information. In such cases, low weighting might be allocated to reflect this difficulty of assessment, so that these potential issues may have less influence on the overall assessment output.

3.2.2 ASSESSMENT RATING

The assessment narrative on a range from A to E is the second output of the ACT indicators. It is supplemented by external data from sources such as reputation platforms, news sources, financial data. This narrative is built up through several steps:

1. PERFORMANCE SCORE INSIGHTS

From each module, the most noteworthy highlights about the company's performance is taken and summarized shortly. In essence, this is a summary of why the company achieved a particular score, module by module. Most focus is given on the lower module scores, where the company has lost the most points and where the most improvement can still be gained.

FIGURE 5 **ASSESSMENT RATING Represented as a letter from A down to E**

2. SECONDARY ANGLES AND ACCOMPANYING DATA SOURCES

After the mining of the performance score output, the assessor reviews the data that is available on the company with the following four dimensions in mind:

i. Business model and strategy
ii. Consistency and credibility
iii. Reputation
iv. Risk

The (i) Business model and strategy dimension explores whether the company has experience in running a profitable business from low-carbon activities. Is the company's short-term strategic direction significantly influenced by decarbonization efforts? Are the company's climate targets and goals aligned with recent actions such as acquisitions and mergers? Does the company invest R&D in those technologies that it places its faith on for the transition?

Then, the (ii) consistency and credibility dimension looks at whether the company's transition plan and accompanying scenario analysis is consistent with its short and long-term business strategy. Is the company's policy position and influence not in conflict with its own climate-related communications? Are there conflicting incentives in place that discourage a low-carbon transition in certain parts of the company? Does the group (that the company is part of) have any conflicting activities that undermine its ability to transition?

Third, the (iii) Reputation angle starts with the company's RepRisk* score. Then the assessor explores whether there any serious events in the company's history that may hamper its credibility towards the low-carbon transition, and therefore its credibility for receiving a higher ACT assessment.

Fourth and last, the (iv) Risk angle takes a look at specific indicators from the performance score and external information which can help identify any major future risks that the company may face. Questions may be for example the reliance of the company's profits on high-carbon activities. External factors are also explored, such as policy constraints or technological barriers/ cost barriers to the successful implementation of the company's transition plan.

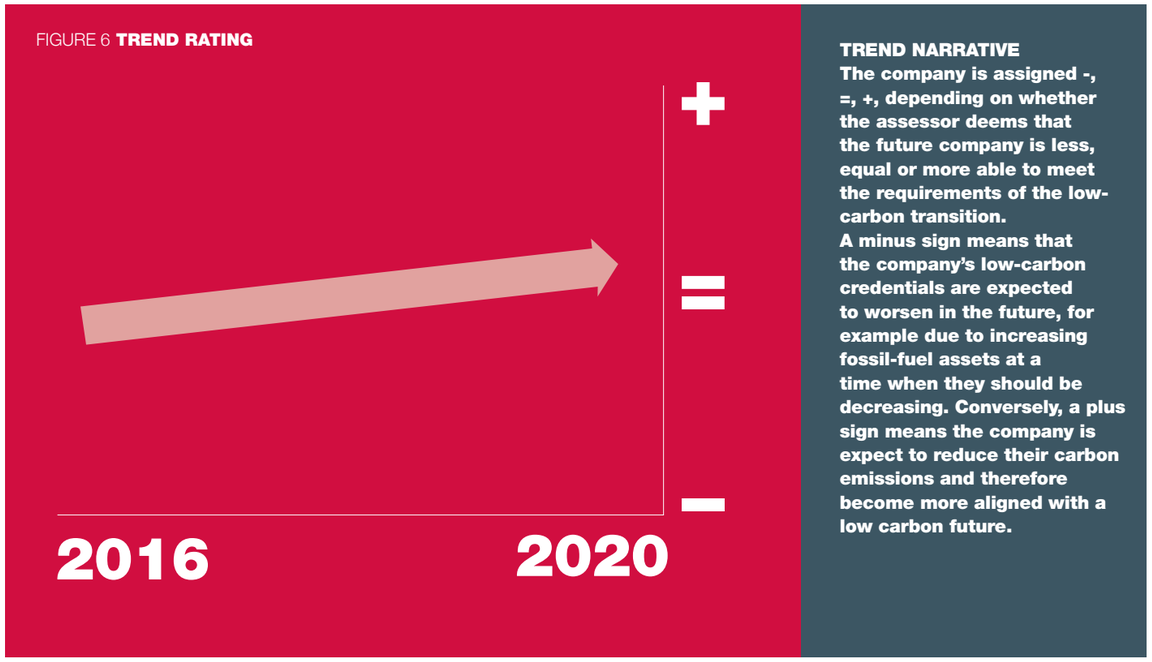
Finally, the information gathered through the Performance Score Insights and Secondary Angles is taken into account by the assessor when answering the five questions of ACT:

- What is the company planning to do? (Commitments)
- How is the company planning to get there? (Transition Plan)
- What the company doing at present? (Present)
- What the company done in the recent past? (Legacy)
- How do all of these plans and actions fit together? (Consistency)

The assessment narrative is holistic, in that it takes into account any and all relevant information encountered by the assessor, and any other key interpretations and insights that can now be made. The assessor should now have a very good idea about how the company functions intrinsically. The assessment narratives in the ACT pilot have evolved over time as experience was gathered with the most effective way of communicating the lessons learned. Notably, for some pilot companies it has been fully shaped as a narrative, drafting answers to these five questions, and for others it has been more directed by methodically describing and summarizing the performance on each of the main ACT modules, adding information and learnings from the other frameworks employed.

*https://www.reprisk.com

FIGURE 6 **TREND RATING**



TREND NARRATIVE
The company is assigned -, =, +, depending on whether the assessor deems that the future company is less, equal or more able to meet the requirements of the low-carbon transition.
A minus sign means that the company's low-carbon credentials are expected to worsen in the future, for example due to increasing fossil-fuel assets at a time when they should be decreasing. Conversely, a plus sign means the company is expect to reduce their carbon emissions and therefore become more aligned with a low carbon future.

3.2.3 TREND RATING

The trend score on a range of +, =, - is an output mode that attempts to use all relevant forward-looking information gathered through the ACT assessment to provide a judgement on whether the assessor expects the company to move closer, farther away, or remain equal to its current path.

The assessor attempts to answer the question whether, the ACT score would improve significantly (+), stay more or less the same (=), or worsen significantly (-), if the assessment would be repeated in the short-term future To create a future trend score, the data is mined for those indicators that express a change in a direction in which the assessor is reasonably confident. For example, if an Electric Utility company is currently in the planning process of building several new generation plants, then the successful implementation of this would mean that the company could move further away or closer from their decarbonization pathway, depending on the technology type for this new generation capacity. This exercise is repeated for all possible major 'events' that could significantly alter the company's direction and signal that the current ACT score would be different in the future. The result of these events is then considered together to come to a consolidated assessment of what the overall trend of the company will be.

To draft a future trend score, the data is mined for those indicators that indicate a particular event to change in a particular direction in which the assessor is reasonably confident. For example, if an Electric Utility company is currently in the planning process of building several new generation plants, then the successful implementation of this would mean that the company could move further away or closer from their decarbonization pathway, depending on the technology type for this new generation capacity. This exercise is repeated for all possible major 'events' that could significantly alter the company's direction and signal that the current ACT score would be different in the future. The result of these events is then considered together to come to a consolidated assessment of what the overall trend of the company will be.

FIGURE 7 **ACT INDICATOR FRAMEWORK**

	ACT MODULE SET FOR INDICATOR DEVELOPMENT	
1	TARGETS	
2	CORE BUSINESS PERFORMANCE	MATERIAL INVESTMENT
3	CORE BUSINESS PERFORMANCE	INTANGIBLE INVESTMENT
4	CORE BUSINESS PERFORMANCE	MANAGEMENT
5		SOLD PRODUCT PERFORMANCE
6	INFLUENCE	POLICY ENGAGEMENT
7	INFLUENCE	SUPPLY CHAIN ENGAGEMENT
8	INFLUENCE	CUSTOMER ENGAGEMENT
9		BUSINESS MODEL

3.2.4 INDICATOR FRAMEWORK

The key question that underpins the ACT assessment is 'what does a company propose to do to transition to a low-carbon future?' In order to assess this, a particular focus was given to companies' explicit targets in terms of reducing carbon emissions. Once a company's future targets are outlined, it is important to understand how the company proposes to reach these targets. Company plans will need to be disclosed and interpreted with particular emphasis on what is under direct control, such as the carbon intensive nature of its products and investments. Additionally, ACT assesses aspects that a company influences indirectly, such as the impacts of the value chain, policy or regulations.

In order to assess the company, a variety of indicators were chosen; some sector-specific, some spanning more than one sector. As not all indicators are equally relevant through time, some build on past and present information to provide an attempt to measure the future. In this respect, ACT reviews a company's past performance to gain insight into how they may perform in the future, and whether the targets set seem achievable. For investors that favour 'future orientated' information, more value is given to disclosure that is more insightful about the future. Therefore, it is important that these indicators encompass a variety of time-scales to create a model that can help in guiding through the systematic assessment of relevant areas to characterise a company's response to climate change, and therefore the transition to a low-carbon economy.

3.3 MODULE LEVEL: QUANTITATIVE SCORING

There are many distinct ways to derive numerical scores of company-reported quantitative and qualitative information at the indicator level, for the purpose of calculating a company's overall performance score. Almost all quantitative information is used as inputs in dedicated assessment models that attempt to compare the company's information with what is required by climate-economic models. The primary model used for this is the IEA 2DS and the accompanying IEA ETP (Energy Technology Perspectives) [1].

The IEA 2DS is a climate model that outlines, by geography, how much each economy needs to decarbonize between the present and 2050 to have at least a 50% chance of staying under the 2-degrees warming limit. The IEA ETP uses this model to derive decarbonization targets for all relevant economic sectors in 2050. These targets are then used to interpolate back to the present to define short-term visions on how certain sectors need to develop to make long-term targets a possible reality. For example, for the transportation sector, the IEA ETP postulates that there will need to be over 25 million electric vehicles on the road by 2025 to stay within the allocated carbon budget for the sector, given the expected growth of the global vehicle fleet.

For each ACT sector, the sectoral decarbonization approach (SDA) was used to 'downscale' the national/global level climate projections to the company level [2]. ACT has expanded on the SDA by adding geographical weightings for the Electric Utility and Auto sectors, as well as by adding specific scenario projections for different transport modes, so that the retail sector targets could be more effectively assessed.

The remainder of this chapter will explore how ACT has converted insights from the employed assessment models into meaningful scores that could be consolidated into a meaningful performance score. The major principles of this exercise was to try keep the numerical output score as representative of the actual situation as possible. This means that, in an ideal world, a score of 80% on a particular indicator also translates to an 80% value of the real world variable that this indicator has attempted to represent.

3.3.1 GAP METHOD

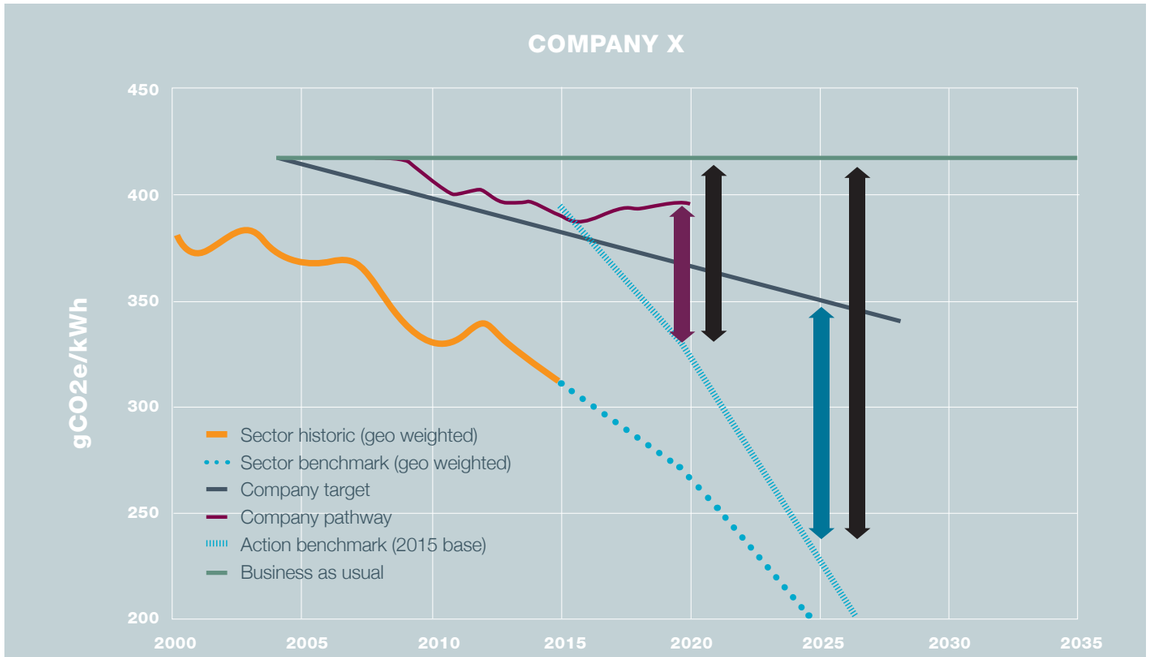
The paramount method is the gap method of interpreting the assessment models. This is inspired by the UNEP 'Emissions gap' report. Figure 8 shows the methodology of the gap method.

As the principal scoring methodology for most future-looking indicators, the gap method compares the distance that the company is removed from their decarbonization pathway. A 'business as usual' line is used to anchor the measurements. For simplicity of measurements and to avoid the uncertainty in choosing economic growth models, business as usual is always modelled as a straight line indicating no improvement in emissions intensity of whatever indicator it is used for.

In the example above for an Electric Utility, the company pathway (as derived from modelling the future emissions from their current asset portfolio) predicts a relatively stable emissions intensity between 2015 and 2020. However, according to the action benchmark, the company should be well on its way to reduce its emissions intensity by then, resulting in an **Action Gap** of 75%, compared to a 2005 baseline. Another way of putting this is that the company's efforts only bring about 25% of the progress needed to reach the goal. Similarly, for the company's target and its **Commitment Gap** of 64%, the company's target will only bring about 36% of the required effort in 2025.

To ensure comparability, the gap method scoring places some limitations on the data. For example, the business as usual baseline and decarbonization pathways need to start from the same years, and the gap measurements need to be taken from the same years. Companies need to be compared at the same time in the future or present, as the decarbonization pathways are nonlinear and therefore the distance between the business as usual baseline and the pathway will not change with time.

FIGURE 8 **GAP SCORING**



Action and commitment gaps using the gap method

Commitment gap_{2025}:

$Target_{2025}$ – $Benchmark_{2025}$

Action gap_{2020}:

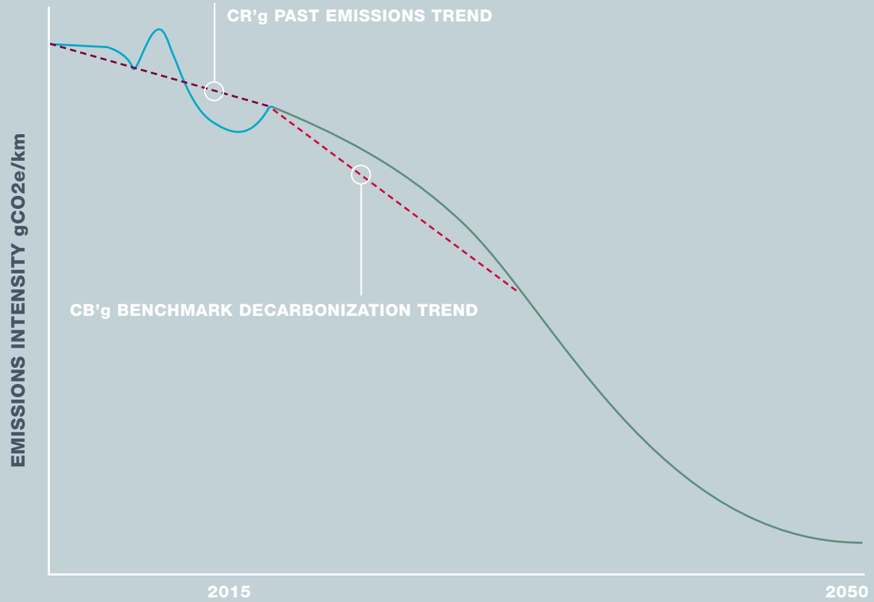
$Intensity_{2020}$ – $Benchmark_{2020}$

Comparison to 'Business as usual' gaps

Company X:

Commitment gap_{2025}: 64%, Action gap_{2020}: 75%

FIGURE 9 **TREND SCORING**



Comparison of the past emissions trend CR'g with the benchmark decarbonization trend for the future CB'g.

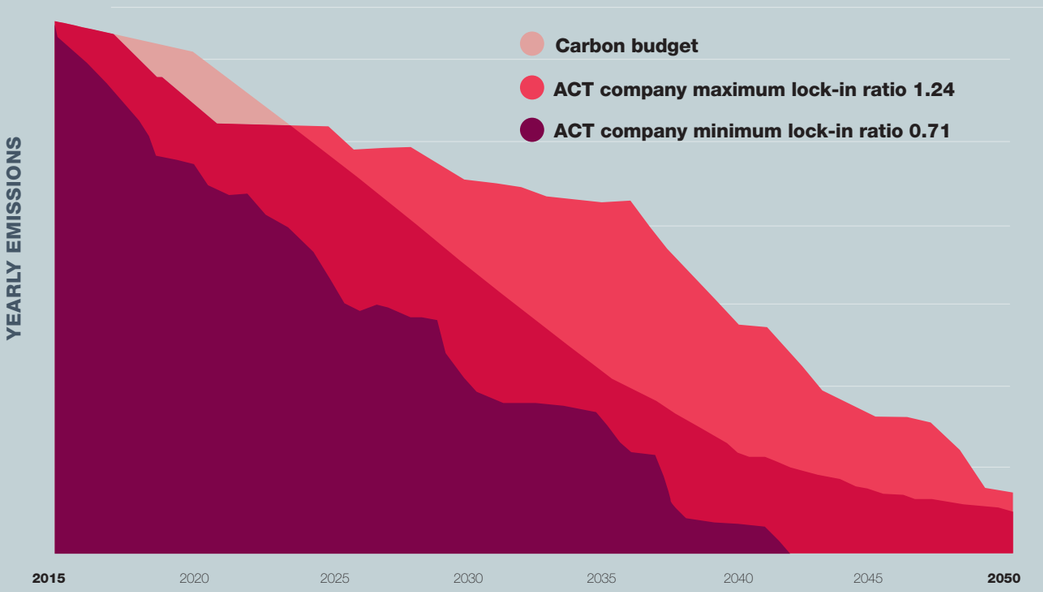
3.3.2 TREND METHOD

The gap method measures progress on forward looking indicators at a singular point in the future. It is therefore only a snapshot measurement, and the choice of measurement point and base years for the baseline/ benchmarks therefore may influence the eventual outcome. In order to incorporate multiple years of data into a single measurement, the trend ratio is employed.

Figure 9 shows how trend lines are employed to measure the speed of decarbonization for both the past and future pathway of an auto manufacturer's fleet emissions. In this example, the indicator provides a maximum score if the past-trend is already in alignment with what the future trend prescribes. The timescales of the trend lines in the graph are not indicative of real choices made in the indicator but chosen for the sake of clarity of the methodology.

Comparing trends allows information from multiple years in the past to interact with information in the short to medium term future. For example, the 'past emissions' indicator that is used for all sectors in ACT compares how the past decarbonization efforts by the company compare to the speed of decarbonization required in the next 5 years. Companies that have already shown that they can decarbonize at the required speed get the maximum score, as they have maximum credibility in their promise to stick to a science-based pathway.

FIGURE 10 **RATIO SCORING**



Comparison of the ACT sample minimum, maximum and emissions budgets using the ratio scoring method

3.3.3 RATIO METHOD

When dealing with indicators that present cumulative data over time, the ratio method can be employed to make a direct comparison to a relevant benchmark on that cumulative data. The most obvious and only example in which this is used in for ACT is to compare company specific emissions lock-in from asset portfolios and vehicle fleets to carbon budgets.

In the example above, the method is used to compare the carbon budget to the emissions lock-in for the electric utility sector. A direct comparison is made between the area of the blue and green locked-in emissions and the orange carbon budget. In this example, the locked-in emissions have been truncated so they could be fitted to the same carbon budget, and anonymized. A direct comparison is made between the area of the budget and the locked-in emissions to compute the lock-in ratio. This can be converted into a score, usually by limiting any positive score to a ratio of 1.0 or lower, depending on the demands of the indicator.

FIGURE 11 **STATIC MATURITY MATRIX**

BASIC	STANDARD	ADVANCED	NEXT PRACTICE	2° ALIGNED
Business as usual, no obvious action beyond the economic activity.	Recognition of responsibility and implementation of standard emissions reductions.	Industry benchmark of emissions reduction recognized as leadership level.	Next practice in climate change mitigation, showing signs of business model transformation.	Full leverage of potential options to reduce emissions across all relevant sources.

3.3.4 RELATIVE INVESTMENT/ OUTPUT BENCHMARKS

So far, all methods considered have in one way or another been designed to directly or indirectly compare a company's performance to a decarbonization pathway. However, some indicators may involve benchmarks that are not directly related back to an emissions pathway, but are intrinsically linked to the process of transition.

For example, the adoption of low-carbon vehicles as an alternative to fossil fuel powered vehicles is a key development in order to make decarbonization of transport a reality. The IEA ETP states the minimum growth rate required in low-carbon vehicles between 2015 - 2025 in order to eventually not exceed the carbon budget [1]. This information can be used directly as a benchmark, as it has been linked to the emissions scenarios by the IEA, but is closer to the actual output model of the companies assessed than an emissions trajectory line is.

3.4 MODULE LEVEL: QUALITATIVE SCORING

Although scoring quantitative data is straight-forward owing to the use of standardised benchmarks, qualitative data assessment is more complex and necessitates a different approach. The ACT pilot project uses a maturity matrix to assesses qualitative data, which scores the maturity of an emissions reduction strategy across multiple dimensions. A maturity matrix thus provides the assessor with a way to consider the multidimensionality of various indicators within a sector, combining them together towards a single score. This approach has been used before by several institutions that attempt to measure progress across the complexities of various sectors, due to the challenge of quantifying emissions reduction potential and outcome of collaborative activities within the supply chain.

3.4.1 STATIC AND DYNAMIC MATURITY MATRICES

The maturity matrix approach is carried out in a similar fashion to the CDP scoring system, as it scores a set of narrative data points that do not have a quantitative interpretation. Narrative answers that detail certain strategies are checked for whether they include specific elements that the ACT assessment deems vital for the particular indicator. Dimensions for each indicator are identified, ranging in different aspects such as geographical range and measure of success. Therefore, it allows the scoring of qualitative data that cannot be easily defined as a quantitative key performance indicator (KPI). Actions are placed on an 'impact spectrum' ranging from basic to low-carbon practice on a scale of 1 to 5, the higher the score the more mature the strategy.

ACT uses static and dynamic maturity matrices to assess qualitative information. For most qualitative indicators across the Management, Supplier/Customer engagement and Policy engagement modules, a static matrix was used that had five levels. The table below shortly lays out the level of ambition expected in an answer that is on a particular level.

For each question, a static maturity matrix was developed between 1 and 7 dimensions, each of which had between 2 and 5 levels on the scale in the table above. Some complex dimensions could be scored in all 5 levels, but some are binary, in which case they only have an option in the basic (0 score) and 2° aligned level (maximum score). This shows that maturity matrices can be adapted to the needs of the scoring methodology as well.

For indicators with more than 1 dimension to score, the sub dimensions can also be assigned separate weights, so that for example the timescale of a transition plan can be weighed more or less heavy than its level of approval within an organization.

FIGURE 12 **DYNAMIC MATURITY MATRIX**

BASIC	STANDARD	ADVANCED	NEXT PRACTICE	2° ALIGNED
		Company intervention or business model activity	Next practice level of the business model activity defined by assessor	Maximum level of activity that unlocks the full potential emissions reduction

Most indicators were assessed statically through the maturity matrix, whereby they were assessed against predetermined criteria. The maturity matrix also enabled the use of a dynamic approach to scoring, for instance when assessing the Retail sector's intervention approach. Here, strategies are scored through a theoretical exercise of feasible mitigation potential.

Dynamic maturity matrices were used when the information was expected to be too heterogeneous to accurately fit to a predefined scoring matrix. They were used when there are many instances of individual events and/or actions that need to be scored one by one and then collated into a single score. This was relevant for the Business Model directions & Retail Interventions approach for Sold Product Performance.

In a dynamic maturity matrix, some requirements for the data that is needed for an optimal answer are defined, but these are mostly not linked to scoring levels. The actual maturity level for the information is only defined after the information has been received. This is done by scoping out how much the action and/or event taps into the full potential emissions reductions of the space that it operates in. For example, a retail company could choose to reduce its emissions from logistics by using used frying oil for its truck fleet. For an ideal disclosure, the company has information on the GHG mitigation potential of any action it undertakes towards this goal. This information allows the assessor to use quantitative information as well as outside research on the mitigation potential of this action, and then assess whether the company's implementation lives up to this potential.

However, in most cases, such information is not available. In that case, the assessor takes a more liberal view and attempts to scope out whether the company has done the maximum potential emissions reduction activities within the space of reducing logistics emissions through the choice of fuel. If the assessor finds that only a minority of the company's truck fleet is actually using the new sustainable fuel, then there is still untapped potential for the company to expand on to, and they are not on the maximum scoring level of 2° aligned.

For each company intervention that was scored this way, the assessor has defined the maximum potential state that this could be in, given current technology and/or market conditions. Then, the distance between this theoretical potential and the real world defines then the place on the scale where the intervention resides, and also what improvements must be made to the actions the company is taking in this space, to take it to the levels above it. An intervention that is relatively close to its maximum potential will be on 'Next Practice' level, while one that is very basic and still has many steps to go will be on a lower level. This is the dynamic definition of the maturity matrix.

Ultimately, ACT proposed to build a database of these interventions, whereby the scoring activities of past assessments on interventions from other organizations would be used to inform about the correct assessment of new interventions. This allows for self-learning and continuous improvement of the methodology as it is implemented. However, the scope of this pilot project was not large enough to ultimately have enough resource available to build such a database. For larger implementations of ACT using dynamic maturity scoring, it is however recommended to build such an infrastructure, especially when working with multiple assessors on the same sector.

Full articulation with other initiatives
Table of comparison

ACT development is not occurring in a vacuum and there are a variety of related approaches being developed to tackle the issue of advanced corporate climate action. ACT project partners are themselves involved in a number of these initiatives. These have informed ACT in two main ways:

Firstly by offering specific methodological approaches which have been incorporated, or supplying specific data for assessments.

Secondly, the general knowledge and experience gained from the development and implementation of these allied initiatives was used by the ACT methodology development team to make ACT methodology development more effective.

INITIATIVE	ORGANISATIONS LEADING	DESCRIPTION	KEY OUTPUTS	INTENDED USERS	ARTICULATION WITH ACT
ASSESSING LOW-CARBON TRANSITION	ADEME, CDP	ACT develops sector-specific methodologies to assess company alignment with low-carbon transition and produce a rating reflecting the results. The Pilot project produced confidential ratings for 12 companies across the Electric Utility, Auto and Retail sectors.	Sector-specific methodologies, and individual company ratings of alignment with low-carbon transition.	Rating agencies, investor analysts, program operators, companies	N/A
SCIENCE BASED TARGETS INITIATIVE (SBTI)	CDP, WRI, WWF, UNGC	The SBTi seeks to develop and disseminate best practice in setting corporate GHG reduction targets to ensure that company targets are in line with the requirements of climate science.	New methodologies by which companies can set science-based targets; clearing house of third-party methods for target setting and associated tools; validation of company targets	Companies seeking to set science based targets	SBT's Sectoral Decarbonisation Approach methodology forms the basis of developing company emissions benchmarks in the ACT methodology.
SEI METRICS	2DII, Frankfurt School of Finance, University of Zurich, Cired, Kepler-Chevreux, Climate Bonds Initiative, CDP, WWF Germany, and WWF EPO	Key features of the SEI Metrics approach include being a portfolio-level analysis involve the use of bottom-up, physical asset level databases for key sectors and their matching to financial securities (a global universe of listed equities and corporate bonds). The portfolio-level focus of the project led to the use of bottom-up asset-level data that with universal coverage rather than data obtained from corporate disclosure such as the CDP survey.	Portfolio assessment tool measuring the alignment of listed equity and corporate bonds portfolios with climate goals, and associated potential capital misallocation under various decarbonisation pathways.	Investment analysts and portfolio managers	Overlap of asset level source data for assessments. Knowledge sharing by project partners on data issues.
CDP SCORING	CDP	CDP produces over 7,000 scores annually, based on the information disclosed by companies to its Climate Change, Water and Forests programs in response to CDP questionnaires. CDP scoring partners apply the CDP scoring methodologies to produce scores which are made available to the public	Annual company scores for climate change, water and forests performance.	Companies, investors, general public	Insights from CDP scoring methodologies and information disclosed to CDP was used in ACT methodology development and ratings.
CDP INVESTOR RESEARCH	CDP	CDP investor research provides new insight on the climate-related risks facing large emitting sectors, which may have an impact on the valuation or value creation potential of these companies.	Regular research reports and rankings of large companies in the biggest emitting sectors	Investment analysts, portfolio managers, asset owners.	Insights and experience of the CDP investor research team informed ACT methodology development.

SEI METRICS AND ACT

2° Investing Initiative has led the development of a portfolio assessment tool, which measures the alignment of listed equity and corporate bonds portfolios with climate goals and associated potential capital misallocation under various decarbonisation pathways.

The tool has been developed as part of the EU H2020 grant programme Sustainable Energy Investing (SEI) Metrics project, involving Frankfurt School of Finance, University of Zurich, Cired, Kepler-Cheuvreux, Climate Bonds Initiative, CDP, WWF Germany, and WWF EPO. Since its launch in December 2015, it has been applied by over 80 investors worldwide, and to over 1000 portfolios. The method is also being explored as a financial supervisory tool for monitoring capital misallocation by policymakers and regulators in 3 European countries as well as the United States. Notably, the Swiss government will provide a voluntary and free disclosure opportunity for all Swiss pension funds and insurance companies based on the model.

The tool tracks fixed and planned physical assets associated financial portfolios across 10 climate-related technologies and 3 sectors (fossil fuels, electric power, automobile), with expansion planned to an additional 4 sectors in 2017 (aircraft, shipping, cement, steel). In this way it covers roughly 80% of GHG emissions in a typical equity portfolio and around 15-20% of market capitalization. The analysis allows investors to identify the extent to which the portfolio's physical asset and / or investment profile is (mis)aligned with a 2°C or alternative scenario [1]. The framework has been designed in parallel with the Article 173 of French Energy Transition Law, on mandatory climate disclosure for investors that makes 2°C target setting and alignment assessment mandatory from 2017 onwards. In addition to assessing potential capital misallocation with regard to a 2°C transition, the assessment also calculates exposure to certain physical risks for the assets in the sectors highlighted above (e.g. drought, etc.).

The tool was developed as an open-source model and thus can be applied for free, with a planned launch on two major financial database platforms in 2017. In a feedback survey among investors conducted as part of the model's road-test and development, 90% of respondents said they were likely to use the model to inform their investment process (e.g. through investment decisions, shareholder engagement, etc.).[2] A number of investors have either publicly or anonymously announced the use of the results to set portfolio-level targets, inform stock picking and/or shareholder engagement practices.

As both the ACT Initiative and SEI Metrics projects focus on the forward-looking alignment of companies/issuers with the low-carbon transition, it is useful to provide a detailed comparison of the two. Compared to the ACT initiative, unique features of the SEI Metrics approach include a portfolio-level analysis, involving the use of *bottom-up, physical asset level databases* for key sectors, and matching these to financial securities (a global universe of listed equities and corporate bonds). The *portfolio-level* focus of the project led to the use of bottom-up asset-level data with universal coverage rather than data obtained from corporate disclosure such as the CDP survey. This was chosen to take advantage of the key aspects of such data: universal, forward-looking coverage in key sectors (e.g. 99% of global power generation, 99% of global light duty automotive production, etc.), high geographic resolution (often geolocational but at least country-level), and the ability to produce consistent reporting boundaries (e.g. equity share, financial control).

However, while such advantages exist, the use of such data has key challenges, including its usually unverified nature, acquisition cost, limited sectoral coverage, and the need in some cases to manually connect it to issuers and financial securities. Further, some users prefer to have quantitative metrics coupled with narrative disclosures describing the company's management and planning for the transition. In this way, the projects are highly complementary, since the SEI Metrics approach provides a consistent quantitative framework for key sectors, while the ACT approach can help companies verify external forward-looking data and provide a more holistic approach for assessing companies' readiness for transition, including management and innovation issues.

1 Scenarios used to date include the IEA 450S and 2DS scenarios, as well as the Greenpeace Energy Revolution scenario.
2 Based on 23 investor responses to an anonymous, quantitative survey provided to road-testers of the tool.

4 ACT Sector approach

ACT methodologies are sector specific, because the contributions different sectors make to global emissions differ greatly, and different actions will be required of different sectors as they play their part in the transition to the low-carbon economy. The three sectors chosen for the pilot typify a range of challenges companies will face during the transition to the low-carbon economy. The approaches developed for these sectors during the pilot will be applicable to other sector methodologies in future. Each sector is briefly introduced here, but the dedicated sector chapters will delve more deeply into the challenges faced, their potential solutions, and how ACT designed indicators to measure progress against these.

The **Electric Utilities sector** was chosen as it is the single largest emitter of CO2, around 25% of global emissions according to IPCC estimates. These emissions are then indirectly accounted for as indirect emissions of anyone who uses the electricity produced. Decarbonization of the power system is one of the key pillars on which the low-carbon transition relies. Low-carbon electricity will also be fundamental to the decarbonisation of many other sectors.

The **Auto Manufacturing sector** is included as it is the representative sector for transportation, which as a whole also represents a very large amount (14%) of all emissions from fossil fuels. The primary technology type of the internal combustion engine is also primarily reliant on fossil fuels. The shift away from the ICE and oil to low-carbon alternatives means many different processes have to change and impactful choices made within the sector to make this a reality.

Finally, the **Retail sector** is part of the ACT pilot, in order to understand how to apply the method to a sector whose vast majority of emissions are indirect emissions, and where there is less direct influence through technology choices, such as with the auto sector.

CHAPTER ORGANIZATION

Section 2 of this chapter is dedicated to the insights that can be gained from the overall ACT assessments using the three ratings (Performance, Assessment and Trend). In section 3 each of the different indicator modules that the scores were based on are shortly introduced, and then highlighted with in depth examples of one of the indicators used within this module. Various indicators from across the sectors have been used in these highlights.

Indicator table

	ELECTRIC UTILITIES	WEIGHT	AUTO	WEIGHT	RETAIL	WEIGHT
TARGETS	1.1 Alignment of emissions reductions targets 1.2 Time horizon of targets 1.3 Historic target ambition and company performance	20	1.1 Alignment of emissions reductions targets 1.2 Alignment of Scope 3 inclusive emissions reductions targets 1.3 Time horizons of targets 1.4 Historic target ambition and company performance	15	1.1 Alignment of Scope 1+2 emission reduction target with low-carbon mitigation scenario 1.2 Alignment of Scope 3 emissions target with low-carbon mitigation scenario 1.3 Historical target ambition and company performance	10
MATERIAL INVESTMENT	2.1 Trend in past emissions intensity 2.2 Locked-in emissions 2.3 Trend in future emissions intensity	35	2.1 Trend in past emissions intensity	2	2.1 Alignment of past Scope 1+2 inclusive emissions performance with low-carbon mitigation scenario	5
INTANGIBLE INVESTMENT	3.1 R&D in Climate Change mitigation technologies related to energy generation, transmission or distribution	10	3.1 R&D in Climate Change mitigation technologies related to low-carbon transportation	12		0
SOLD PRODUCT PERFORMANCE		0	4.1 Fleet emissions pathway 4.2 Fleet emissions lock-in 4.3 Low-carbon vehicle share 4.4 Conventional ICE vehicle efficiency performance	35	3.1 Product-specific interventions on a maturity matrixix	40
MANAGEMENT	4.1 Oversight of climate change issues 4.2 Climate change oversight capability 4.3 Low carbon transition plan 4.4 Climate change management incentives 4.6 Climate change scenario testing 4.5 Fossil fuel power incentives	20	5.1 Oversight of climate change issues 5.2 Climate change oversight capability 5.3 Low carbon transition plan 5.4 Climate change management incentives 5.5 Climate change scenario testing	11	4.1 Oversight of climate change issues 4.2 Climate change oversight capability 4.6 Oversight of climate change issues 4.3 Climate change management incentives 4.4 Waste reduction strategy 4.5 Product carbon hotspotting	12
SUPPLIER ENGAGEMENT		0	6.1 Supplier Engagement	6	5.1 Strategy to influence suppliers to reduce their GHG emissions 5.2 Activities to influence suppliers to reduce their GHG emissions	10
CLIENT ENGAGEMENT		0	7.1 Efforts to promote sales of more efficient vehicles	4	6.1 Strategy to influence consumer behaviour to reduce their GHG emissions 6.2 Activities to influence consumer behaviour to reduce their GHG emissions	10
POLICY ENGAGEMENT	5.1 Company policy on engagement with trade associations 5.2 Trade associations supported do not have climate-negative activities or positions 5.3 Position on significant climate policies	5	8.1 Company policy on engagement with trade associations 8.2 Trade associations supported do not have climate-negative activities or positions 8.3 Position on significant climate policies	5	7.1 Company policy on engagement with trade associations 7.2 Trade associations supported do not have climate-negative activities or positions 7.3 Position on significant climate policies	3
BUSINESS MODEL	7.1 Integration of low-carbon economy in current and future business model	10	9.1 Business activities that reduce structural barriers to market penetration of advanced vehicles 9.2 Business activities that contribute to low-carbon optimization of personal mobility 9.3 Business activities around design and manufacture of vehicles to facilitate modal transport shift	10	8.1 Integration of the low-carbon economy in current and future business model	10

4.1 RESULTS AND ANALYSIS

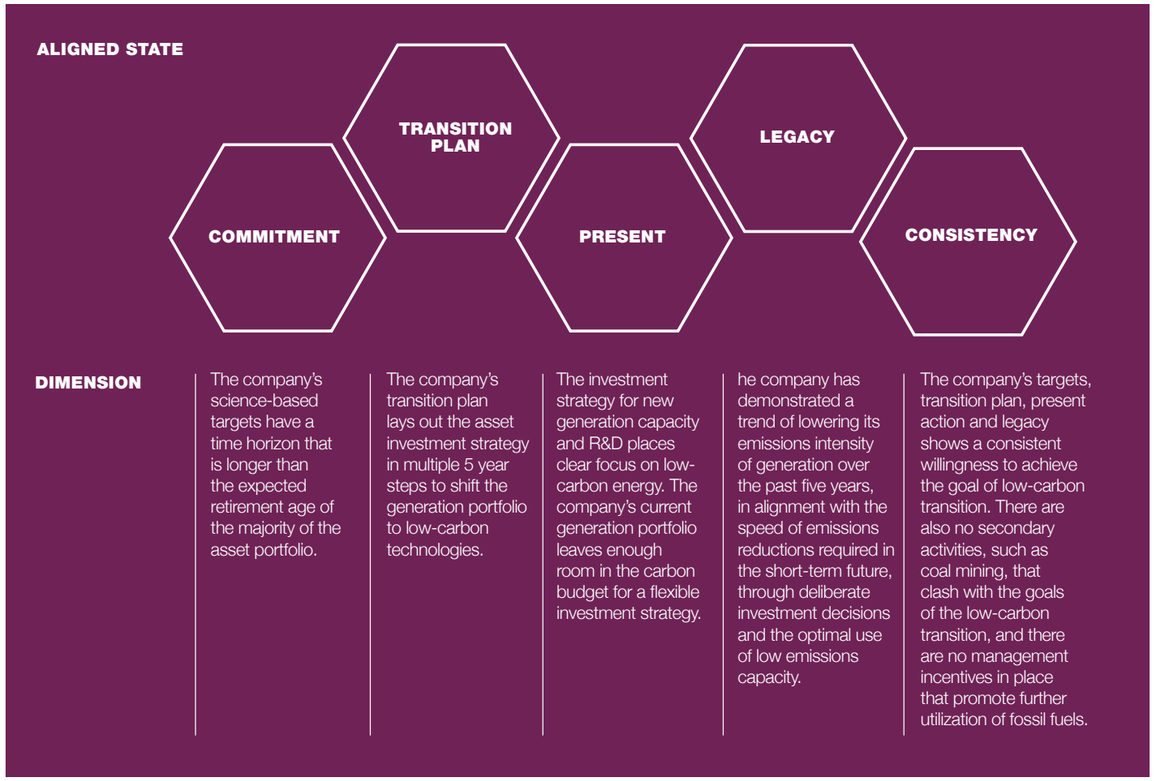
4.1.1 ELECTRIC UTILITIES SECTOR

According to IPCC estimates, the Electric Utilities sector is one of the major contributors to climate change, representing around 25% of annual global greenhouse gas emissions. The International Energy Agency produces an annual Energy Technology Perspectives (IEA ETP) report which analyses what new technology developments are required per sector in order to achieve a below 2°C climate scenario. IEA ETP 2015 concludes that the Electric Utilities sector needs to reduce emissions by 91% by 2050 compared to 2010 levels, which means reducing global average emissions for a kWh of electricity by over 95% across the same period. Adding to this challenge, energy demand is expected to increase by 87% over the same timescale [1]. The key to decarbonising this sector lies in the rapid deployment of low-carbon electricity generation technologies, among other developments in storage, demand-control management and investments in transmission. There is an urgency for this deployment; the decarbonization of the electric utilities sector is vital for the decarbonization of many other sectors, e.g. low-carbon electrification of transport and industry.

To assess companies in the electric utilities sector, the ACT methodology considers in detail each company's asset portfolio and what that might mean for the future of the company. For each aspect of the ACT framework, a summary of what alignment with low-carbon transition looks like for the Electric Utilities sector is given in the table. The indicators in the ACT Electric Utilities methodology measure progress towards this benchmark. Please see the overview on page 30-31 for a complete indicator overview.

FIGURE 13

ALIGNED STATE FOR ELECTRIC UTILITIES



4.1.2 ELECTRIC UTILITIES PERFORMANCE RESULTS

The ACT Electric Utilities sector pilot reveals the pilot companies to be ahead of the curve on climate change strategy and planning for a low-carbon future. Nonetheless, actual performance in transforming their generation portfolio away from fossil generation is lagging behind this picture, with some utilities at risk of not staying within their carbon budget without additional action.

Figure 14 shows the average overall performance score of the EU sector sample. Figure 15 shows the sample average, minimum and maximum scores across the six modules of the ACT Electric Utilities methodology that the performance score is built from.

The pilot companies in the Electric Utilities sector show strong performance on strategy-related indicators that include emission reduction targets, management, policy engagement and future business model, but weaker performance overall on operational indicators that deal with current and future emissions, and R&D investment decisions. This means that at the strategic level, the companies assessed show strong alignment with the requirements of low-carbon transition. However, this has not yet been translated into tangible results that show a rapid shift away from fossil fuel based energy production.

FIGURE 14

PERFORMANCE SCORE

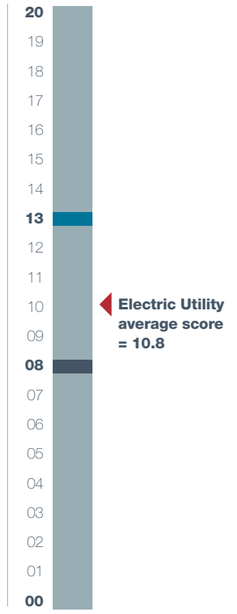
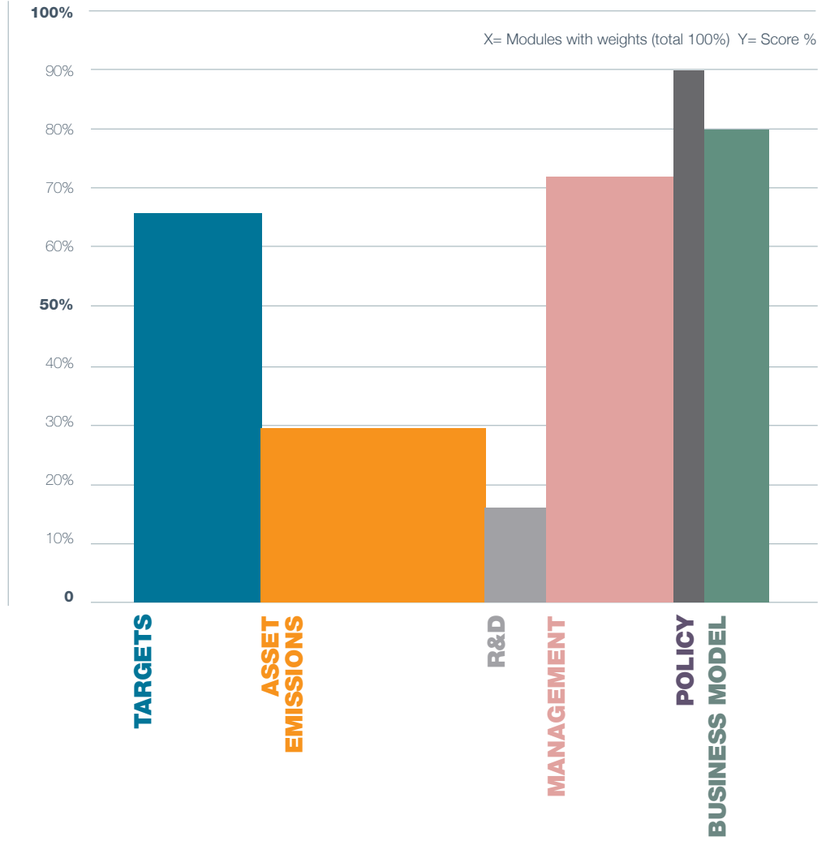


FIGURE 15

MODULE SCORE AVERAGES FOR ELECTRIC UTILITIES COMPANIES



To change this and align with the intent of the company strategies, it is imperative that the sector takes action right now, and no longer postpones important investment choices. This is paramount to the success of the transition in this sector.

The Electric Utilities sector needs to decarbonise to enable a transition in many other energy-intensive sectors. For example, the manufacturing industry needs to rely on a large, stable supply of renewable energy in order to reduce the emissions embedded in its products, and decarbonization of the transport sector is dependent on electrification in many climate scenarios.

4.1.3 ELECTRIC UTILITIES NARRATIVE ASSESSMENT

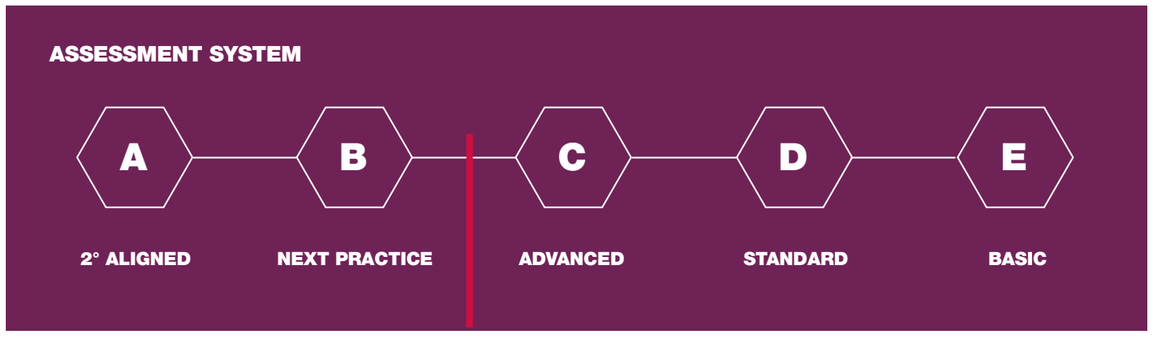
The narrative assessment provides additional tools for analysing a company's overall business model, consistency & credibility, reputation and risks, and consider its viability in a low-carbon world. In the case of the Electric Utilities sample, a high management score in the performance assessment means that the company has a good grasp on dealing with these 4 dimensions.

Therefore, this could in many cases have positively influenced the narrative assessment and provided a higher scoring than what would be expected.

Having said that, there is still a long road ahead for the pilot companies to move from the current middle ground between C and B into the aligned A territory. World emissions need to peak in 2020 and the investment choices made by the Electric Utility sector right now are of capital importance not only to this sector but also to allowing other sectors to reach this short-term goal.

Any new fossil fuel fired power plant is expected to generate electricity for multiple decades into the future, locking-in the type of electricity used by for example manufacturing companies, with an accompanying high emissions intensity. While many utilities in the ACT sample do not have room in their carbon budget for many extra decades of fossil emissions, some have already exceeded their carbon budget on their current portfolio. However, adding more renewable energy capacity will bring the companies closer to the possibility of reaching a low-carbon future.

FIGURE 16 **ASSESSMENT AVERAGE FOR ELECTRIC UTILITIES**



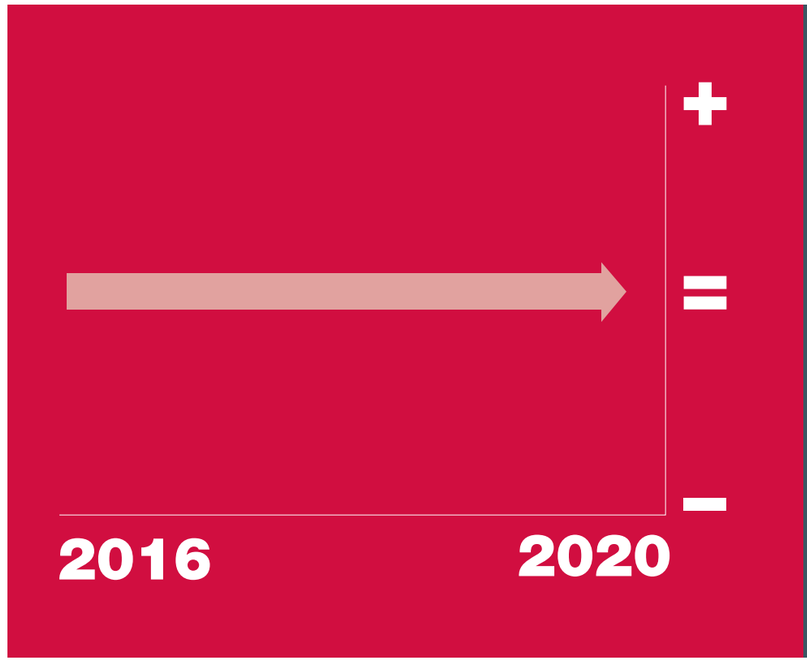
4.1.4 ELECTRIC UTILITIES TREND DIRECTION ANALYSIS

A positive signal developing among multiple power companies is that new coal power development is not considered a viable strategic option for the future. This increases confidence that any new generation capacity will not be realized through this most polluting of technologies, which would lead most companies to quickly exceed their 2015 – 2050 carbon budget.

On the other hand, the assessed companies did not in general show a consistent and ambitious investment strategy that would ensure the development of enough low-carbon generation capacity in the short-term to reduce carbon intensity closer towards the benchmark. For many utilities, the short-term carbon budget between 2016-2020 is exceeded due to few meaningful changes in the thermal fossil asset portfolio in this period. This means that companies are moving farther away from the benchmark as the carbon intensity of their electricity does not decrease fast enough.

Ultimately, for the companies in the Electric Utilities pilot, the average trend score is =, which means the assessor cannot with confidence say whether or not the average performance score will improve or worsen among the assessed companies in the next 4 years, based on current information.

FIGURE 17 **TREND DIRECTION FOR ELECTRIC UTILITIES**



TREND SCORE
The average trend direction for the analysed EU sample is neutral. This means that using current information, if the assessment would be repeated in 2020, the assessor expects that the overall scores for the current sample will not change significantly compared to what they are today. In section 4.1.4 are some observations made during the analysis of companies that relate to the way the trends were analysed in the ACT methodology.

4.1.5 AUTO MANUFACTURING SECTOR

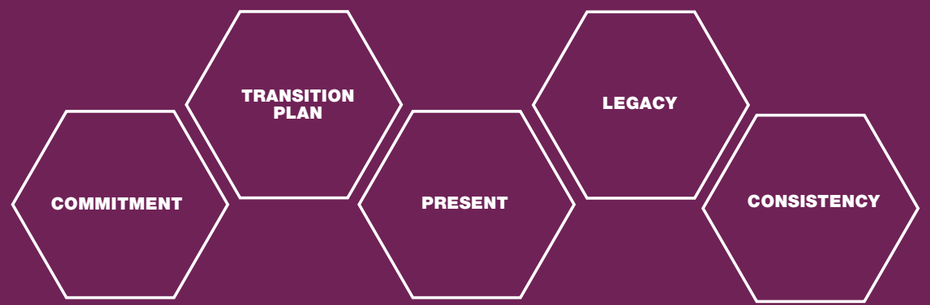
According to IPCC estimates, the transport sector represents almost 14% of all emissions from fossil fuels, and is therefore a significant contributor to climate change. Transport by car constitutes the dominant mode of passenger transportation globally, and emissions from the use of light-duty vehicles need to reduce by 58% between 2010 and 2050, which translates to a reduction of 76% in emissions per kilometre driven[1]. Decarbonization of the auto sector will not only require technology changes in drivetrain and energy sources, but a reshaping of the global infrastructure that supports vehicle refuelling. Due to the complex and highly integrated supply chains of auto manufacturers, close collaboration with the supply chain will be necessary for this technology shift.

For the Auto sector, ACT has taken a detailed look at the company's fleet of vehicles sold over the past five years and developed indicators measuring change from a fleet dominated by internal combustion engines to low-carbon alternatives.

For each aspect of the ACT framework, a summary of what alignment with low-carbon transition looks like for the Auto manufacturing sector is given in the table. Please see page 30-31 for a complete indicator overview.

FIGURE 18
ALIGNED STATE FOR AUTO MANUFACTURERS

ALIGNED STATE



DIMENSION					
	The company has science-based targets for operational and fleet emissions, which have a time horizon that covers at least 80% of the full lifetime emissions of the vehicle fleet.	The company's strategic planning details the sales targets for low-carbon vehicles up to the point where they become the dominant technology sold.	Current investment strategy in new production capacity and R&D places clear focus on low-carbon drivetrain technologies and related research.	A trend is evident of lowering emissions intensity of the vehicle fleet over the past five years that is in alignment with the emissions reductions required in the short-term, through deliberate product development decisions.	The company's targets, transition plan, present action and past legacy shows a consistent willingness to achieve the goals of low-carbon transition. The company does not lobby against vehicle emissions regulations and in fact supports more stringent standards and improved emissions measurements.

1 Energy Technology Perspectives 2015 – International Energy Agency (IEA)

4.1.6 AUTO PERFORMANCE RESULTS

The ACT pilot on the Auto Manufacturing sector reveals a mixed picture of leaders and laggards among the sample. This is expressed both in emissions and vehicle sales performance, as well as in the divergence of maturity in climate change strategies and their effectiveness.

Figure 19 shows the average overall performance score of the Auto Manufacturing sector sample. Figure 20 shows the sample average, minimum and maximum scores across the nine modules of the ACT Auto methodologies that the performance score is built from. Please see the overview table on page 30 for the specific indicators of each module.

The first key observation that can be made with respect to the outcome is the significantly higher average scores than the Electric Utilities sector companies. The main reason for this is the impact of the fleet emissions indicators, which carry a weight of 35% of the available points, and have a high average score of 69/100. The corresponding indicators for the Electric Utilities sector (asset emissions), have an average score of 30/100.

FIGURE 19
PERFORMANCE SCORE

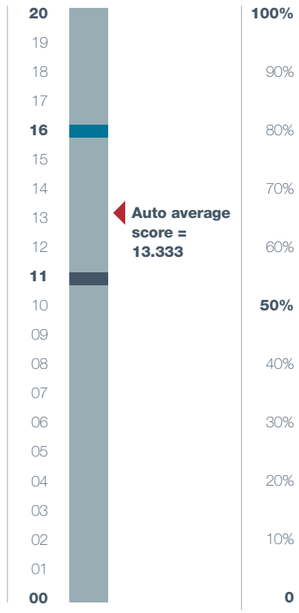
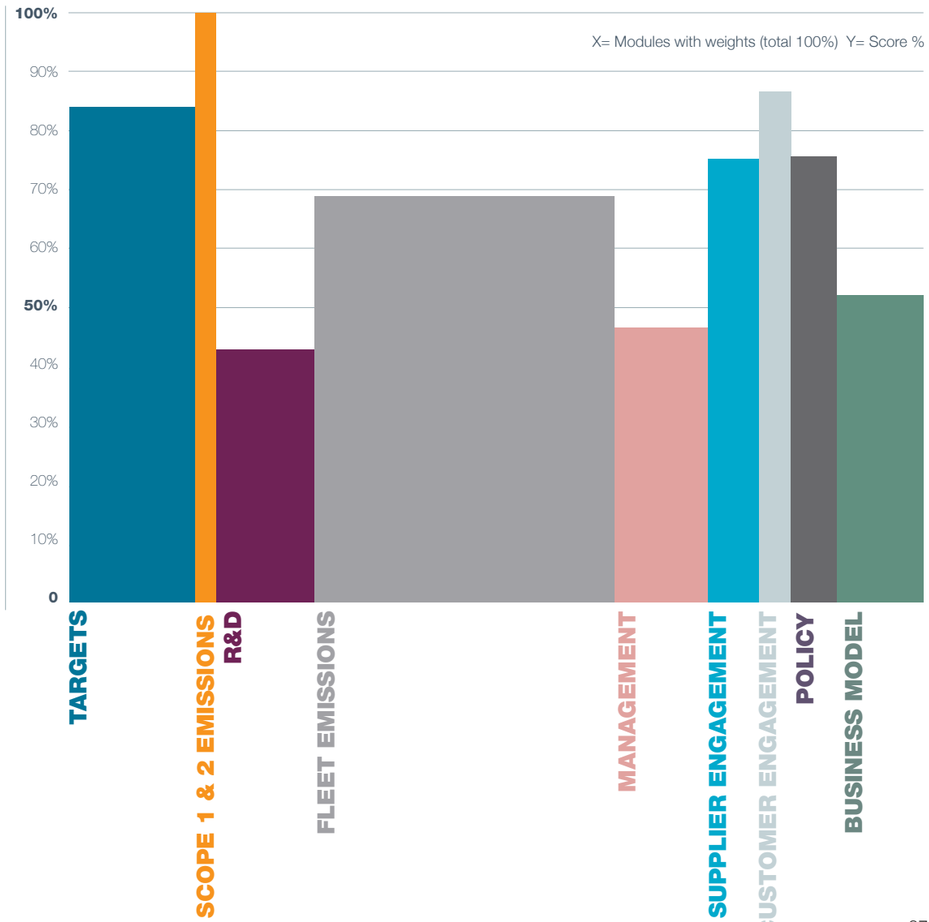


FIGURE 20
MODULE SCORE AVERAGES FOR AUTO SECTOR COMPANIES



The main reason for the positive performance of the Auto Manufacturing sector on emissions, compared to the Electric Utilities sector, is the choice of measurement timeline. The Electric Utilities sector's emissions were measured in the future, by projecting the impact of the current generation portfolios up until 2020 and comparing it to the level of the 2° decarbonization scenario in 2020. By contrast, the Auto Manufacturing methodology measures performance in 2015, as projections to 2020 could not be made with enough confidence given the datasets available on the companies.

As the measurement was done in 2015, the companies were not compared to a future decarbonization pathway. Instead, they were compared to the real-world pathway which is essentially an industry benchmark. The companies that responded to our sample can also generally be seen as market leaders in the transformation to a low-carbon transportation system, which adds an additional sample bias when comparing them to the industry benchmark.

4.1.7 AUTO NARRATIVE ASSESSMENT

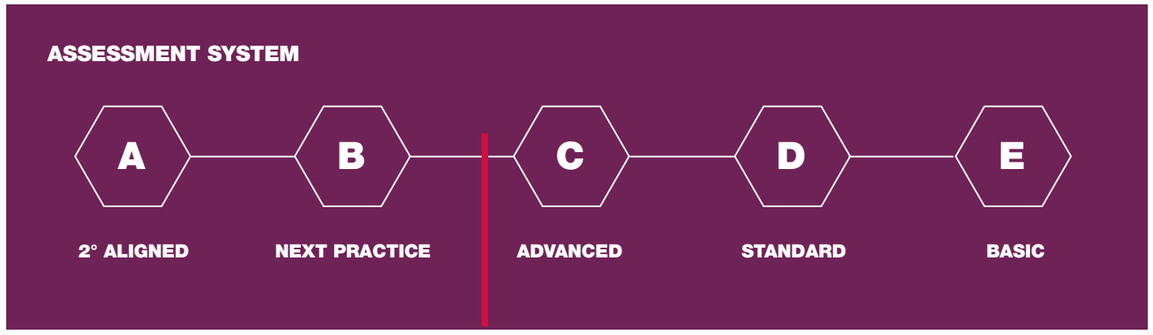
The Auto Manufacturing sector narrative assessment average provides the necessary 'correction' on the overestimate that the performance assessment showed. While there was not enough quantitative data available, the qualitative approach meant the assessor was able to take a more forward-looking approach and consider more future relevant dimensions for the narrative assessment.

Next to Electric Utilities, the choices made by the Auto Manufacturing sector are key in deciding the path that emissions will take for a large part of the world's fossil fuel consumption. However, there is still insufficient progress made across the Auto Manufacturing companies to give a high level of confidence that the sector is aligned with the transition. It should be noted that many of the companies assessed as part of this ACT sample are market leaders in low-carbon technology. Therefore, this sample bias means that even the average score of close to C is likely an overestimate of the low-carbon alignment of the entire auto sector.

One important observation is the higher variability in management scores. While the Electric Utilities responders quite consistently showed high management scores, this is not the case for the Auto Manufacturing sector. The concepts of 2ºC scenario testing and subsequent transition planning on short, medium and longer timescales has not yet been equally adopted by the companies in the sample. Fleet emissions indicators are the most heavily weighted in the assessment, but ACT also seeks a clear strategic focus on reducing fleet emissions via strategy-related indicators on management, business model, as well as customer, supplier and policymaker engagement.

It is Imperative that the sector as a whole adopts transition planning on timescales up to 15 years into the future. This is because cars sold today will be on the road emitting CO2 on a similarly long timescale. To therefore make any meaningful commitment to low-carbon transition these are the timescales on which strategic plans will need to be developed.

FIGURE 21 **ASSESSMENT AVERAGE FOR AUTO MANUFACTURERS**



4.1.8 AUTO TREND DIRECTION ANALYSIS

Despite the need for at least a 15-year long time frame, ACT auto companies only have detailed commitments and plans on a shorter timescale, around 5 years into the future. These are often drawn up in the context of more ambitious 2050 goals that commit to total or near-total decarbonization of the fleet by this far-away date. However, the most important changes in order to reach these goals need to be made in the intermediate period, between 2025 and 2035. This is when the speed of transition is the quickest. The absolute emissions from road vehicles can no longer increase after 2030, and therefore during this time, all car companies need to pivot their business model to one dominated by sales of low-carbon vehicles.

In the case of the Auto Manufacturing sample, positive developments observed are:

1. Convergence of average vehicle emissions for the auto companies in the sample, which means less laggards and almost all companies are moving and doing something;

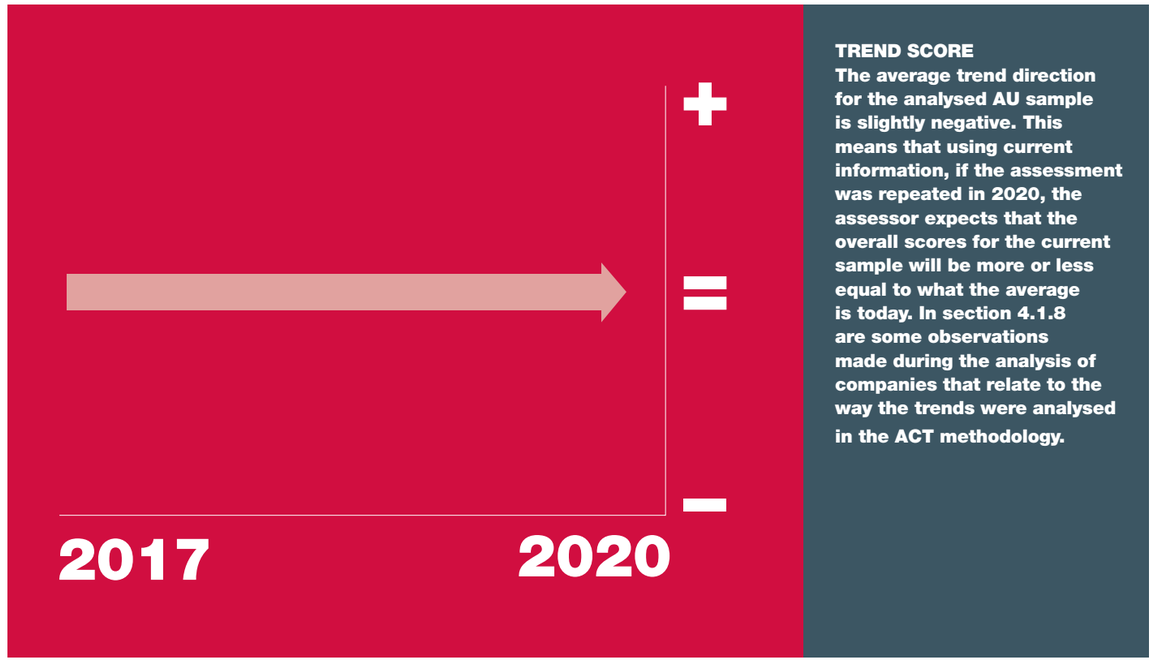
2. Diversification of business models, as for example car sharing initiatives run by the vehicle manufacturer

3. Maturity of low-carbon technology to mass market adoption.

On the other hand, there is also an important gap: transition plans are not ubiquitous or detailed enough to describe the important 'pivot point' of transition (where low-carbon technology takes over fossil technology). Consequently, there is no strong confidence on whether the benchmarks necessary to meet the transition to 2ºC, in conformance with the IEA ETP 2DS scenario, can actually be met by the sample.

To measure the progress that car companies have made so far towards reaching that pivot point within 15 years, ACT employs several indicators that relate to fleet emissions. ACT also directly measures the company's relative participation in the low-carbon vehicle market, which is measured using the low-carbon vehicle sales to market-share indicator.

FIGURE 22 **TREND DIRECTION FOR AUTO MANUFACTURERS**



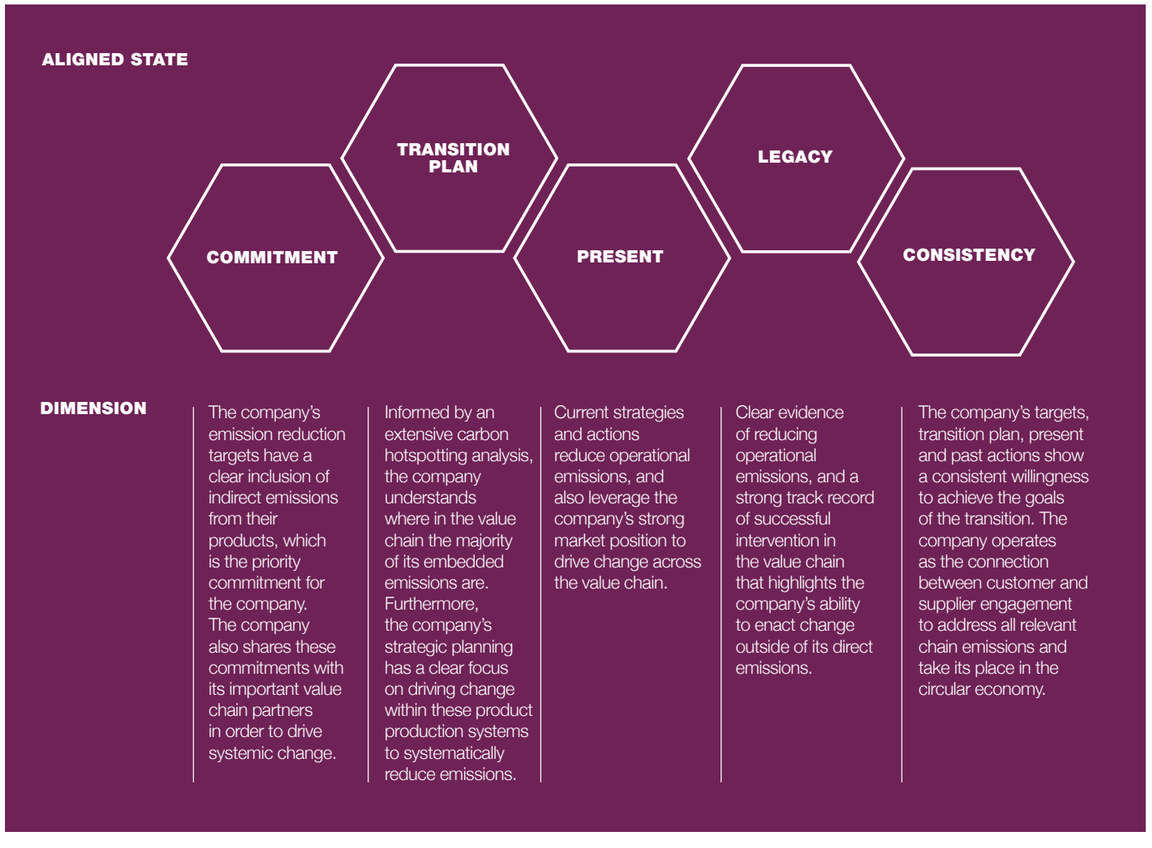
4.1.9 RETAIL SECTOR

The retail sector represents the central interface in the economy where the products of manufacturing reach their ultimate consumers. The majority of emissions attributable to the retail sector are not emitted through a company's own operations, but rather throughout the value chain. A low-carbon transition towards a 2ºC alignment by 2050 will require a transformation not only of the retail sector, but of its whole value chain, from upstream production to downstream use and disposal of products. Their position at the interface of supply chain and consumer means that retailers are uniquely placed to influence behaviour that can reduce emissions both upstream and downstream in the value chain.

Retailers can aggregate a large number of consumer signals to send messages to their suppliers about the need to reduce emissions, or they can make choices which cause reductions in the emissions of their individual customers. The potential total reductions can be very significant.

For the retail sector, ACT has taken a detailed look at the company's value chain emission reduction strategies and what those might mean for the future of the company. For each aspect of the ACT framework, a summary of what alignment with low-carbon transition looks like for the Retail sector is given in the table. Please see page 30-31 for a complete indicator overview.

FIGURE 23
ALIGNED STATE FOR RETAIL COMPANIES



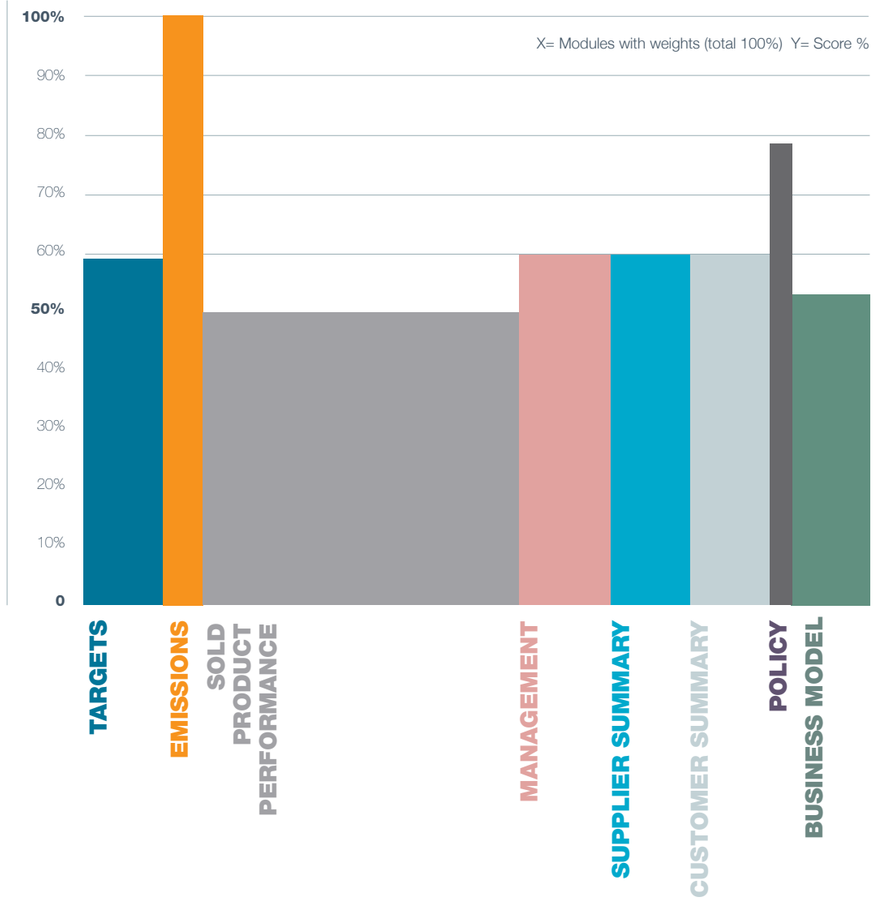
4.1.10 RETAIL PERFORMANCE RESULTS

The ACT Retail sector assessment revealed that while companies have begun to recognise the importance of reducing emissions in the value chain for low-carbon transition, these emissions reductions are not yet being delivered at scale. While promising approaches to help suppliers and consumers reduce emissions in the production or use of products are being trialled, action needs to increase in scale and pace to achieve the large potential emissions reductions that could be catalysed by the retail sector globally. Including value-chain emissions reductions in strategic planning and building on the sectors' responsiveness to trends could help see this potential realised.

Figure 24 shows the average overall performance score of the RT sector sample. Figure 25 shows the sample average, minimum and maximum scores across the eight modules of ACT Retail that the performance score is built from. Of the 9 indicator categories that ACT drafted, the RT sector has used eight of them.

FIGURE 24
PERFORMANCE SCORE

FIGURE 25
MODULES SCORE AVERAGES FOR RETAIL SECTOR COMPANIES



The pilot companies for the Retail sector show a strong performance for their Scope 1 and 2 emissions reductions and their policy engagement, but this is not carried over to their sold product performance and future business model results. This indicates that although the pilot companies are excelling on reducing their operational emissions, they are struggling to translate this expertise to reduce their value chain emissions. Retailers will be a critical actor in the development of a circular, low-carbon economy as they can exert influence throughout the length of complex supply chains, and shifting customer choices and behaviour. Companies need to do more to take on this role, from which they stand to gain not only carbon reduction benefits, but also increased financial value [4].

The overall picture shows a decidedly average performance, with no particular standout indicator modules that the Retail sector excels at, except for reducing operational emissions. The Retail sector performance score was much less driven by quantitative modelling than the Electric Utilities and Auto sector, as the company's effect on their Scope 3 emissions was not measured quantitatively, rather through an action-oriented approach that focused on 'Interventions'. Please see section 5.6 on Sold Product Performance for more information on this and why this choice was made.

4.1.11 RETAIL NARRATIVE ASSESSMENT

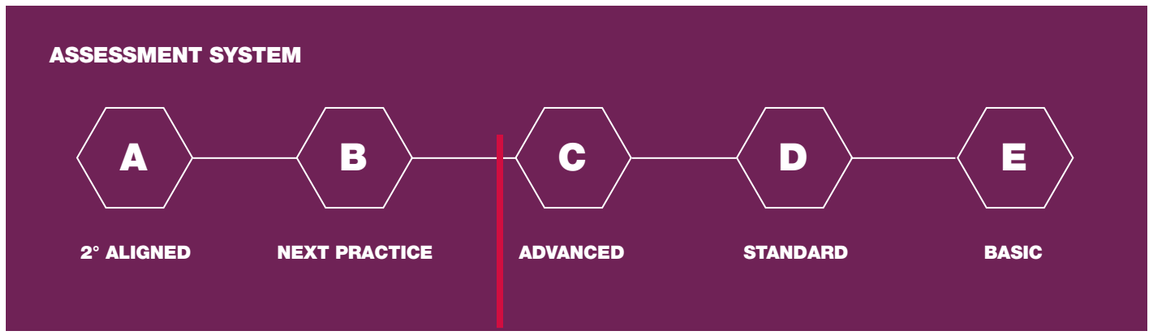
The average assessment narrative rating for the Retail sector is the lowest of the three pilot sectors, at close to C. This is not a surprising result, as it is not a sector that is yet focused on in global climate mitigation and many of its emission reductions lie in the value chain, for which measurement tools and engagement strategies are still in their infancy.

Effectively reducing emissions in the value chain means going beyond collaboration to work on a basis of shared accountability. All stakeholders must recognise the need to work together and hold each other accountable for taking action to reduce emissions. Whereas collaboration may lead to opportunities that are "win-win" for both parties being pursued, a shared accountability approach also allows development of "win-neutral" and even "win-lose" emissions reductions opportunities by including alternative compensation models.

For the retail sector to decarbonize future retail business models will need to better integrate targets to reduce the embedded emissions of their products. Retail companies must take a shared accountability approach in their emissions reductions strategies by working and engaging with suppliers and customers in their value chain to achieve these targets.

The complexity of the retail sector's value chain presents a significant challenge to achieving a complete view of a company's emissions impact.
The ACT assessment therefore considers both qualitative and quantitative information to gain insight into the low-carbon alignment of the sector. The pilot particularly emphasised the analysis of sold product performance. This has enabled a practical, action oriented assessment of the retail sector that has circumvented some of the often encountered barriers of value chain emissions accounting.

FIGURE 26 **ASSESSMENT AVERAGE FOR RETAIL COMPANIES**



4.1.12 RETAIL TREND DIRECTION ANALYSIS

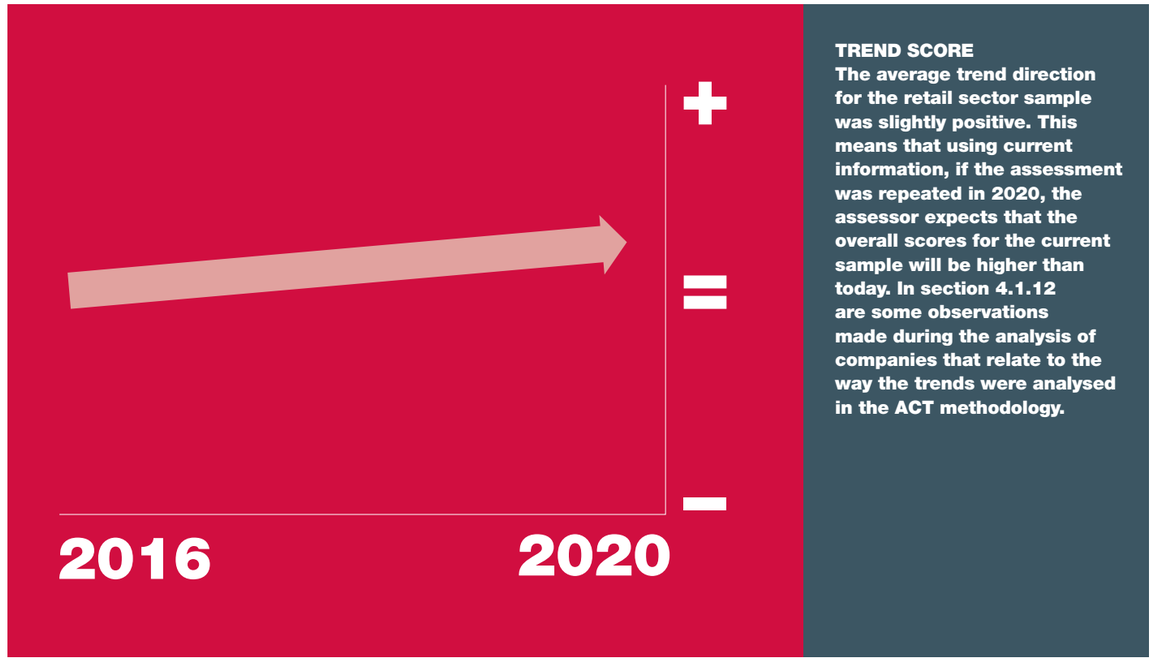
The positive trend score reflects that the Retail sector pilot companies are expected to improve their low-carbon alignment in the future. This shows that the retail sector is beginning to recognise the importance of reducing value chain emissions and the integration of targets that reference the circular economy.

We observe from the sample that awareness of and responsibility for value chain emissions is increasing, with some retailers addressing them by setting science-based targets. This will allow retailers to more effectively target and reduce value chain emissions in the future. The targets that the retailers are beginning to set are ambitious, with effective projects already being enacted that we expect to be successful in reducing value chain emissions in the future.

The concept of shared accountability is critical for the Retail sector to decarbonize because of its complex, dynamic and highly interdependent supply chains, and need for effective collaboration across many different tiers of supplier. Collaboration enables companies to learn and share knowledge to address climate change risks and cut emissions. Shared accountability goes beyond this to seek solutions even where there are asymmetric incentives to reduce emissions.

Effective interventions are already being carried out that will bear fruit in reducing value chain emissions in the future. Such interventions contain a strong local focus and have a track record of achievement, and enable pilot companies to leverage their market position and influence in their value chains in order to achieve GHG reduction targets.

FIGURE 27 **TREND DIRECTION FOR RETAIL COMPANIES**



5 ACT assessment in practice

5.1 MODULE OVERVIEW

ACT relies on the development of indicators which assess the readiness of an organization to transition. To help this development, a separate set of modules was used next to the 5-question ACT framework.

All ACT indicators come from applying the five questions to information on various aspects of company operations. We cannot collect information about the future so instead ACT relies on information from present and recent past to answer the five questions. ACT prefers comparable and verifiable data, and it looks at various spheres of a company's operations, products and external influence to gather information on it. While the 5-questions framework largely follows a chronological pathway from the past towards the future, these modules bring together the indicators across the relevant aspects of company operations to answer each of the 5 questions. This helped in the development process by guaranteeing the consistent application of the framework across all sectors. It served as a tool for systematic interrogation of all relevant areas to characterize a company's response to climate change – and the transition to a low-carbon economy.

The rest of this chapter presents all the indicators that were developed for each module, as visible in Table 1. Not every one of the 9 modules is used for each sector. For example, sold product performance was not deemed relevant enough at this stage for the ACT pilot to develop indicators for Electric Utilities. This does not mean that those indicators do not exist or that it is not relevant, just that the ACT pilot development chose not to prioritize development. For an in-depth view of why each indicator was selected, please refer to the relevant ACT Sector methodology.

FIGURE 28 **ACT MODULE SET FOR INDICATOR DEVELOPMENT**

1	TARGETS	
2	CORE BUSINESS PERFORMANCE	MATERIAL INVESTMENT
3	CORE BUSINESS PERFORMANCE	INTANGIBLE INVESTMENT
4	CORE BUSINESS PERFORMANCE	MANAGEMENT
5		SOLD PRODUCT PERFORMANCE
6	INFLUENCE	POLICY ENGAGEMENT
7	INFLUENCE	SUPPLY CHAIN ENGAGEMENT
8	INFLUENCE	CUSTOMER ENGAGEMENT
9		BUSINESS MODEL

5.2 TARGETS

Since the launch of the Science-Based Targets initiative (SBTi), 212 global companies have committed to adopt a science-based target that allows them to align their reduction objectives with existent scenario pathways towards a low-carbon economy. ACT includes targets as a significant element of the assessment methodology for all three sectors.

Emissions reduction targets are an indicator of corporate commitment to reduce emissions, and are a meaningful metric of the company's internal planning towards the transition. For this reason, they have a significant weight in each of the ACT pilot methodologies. Targets are one of the few quantitative metrics of both a company's short and long-term plans, satisfying ACT's need for quantitative, forward looking indicators that can provide information on the long-term future of a company that can be directly compared to future climate mitigation scenarios.

Emissions reduction targets have three important levers that determine how effective they can be as a management tool: Scope, level of ambition, and time horizon. Firstly, the scope of the target determines which emissions sources are included in the commitment. Scope 1 targets cover operational emissions, Scope 2 targets cover emissions from energy and Scope 3 targets cover emissions from the value chain, both upstream and downstream. The most desirable target scope differs across the ACT sectors. ACT asks companies to act on the biggest emissions sources (hotspots) within their direct and indirect responsibility. This means that the heaviest scoring weight is placed on having targets that cover these emissions hotspots, regardless of scope.

Second, the level of ambition that the targets need to have is determined by the emissions reduction that the sector has to undertake. These sector specific emissions reductions are derived from the IEA ETP carbon budgets, which are converted to company level using the SDA (Sectoral Decarbonization Approach). For example, Auto Manufacturing sector companies need to reduce the emissions from their vehicles so that the automotive share of the entire transport sector reduces emissions fast enough to stay within the transport sector budget [2] [1].

Third, the time horizon of the targets is important for several reasons. The low-carbon transition is a long-term process which will take several decades. Therefore, targets need to consider the long term in order to cover the majority of the reductions needed in this transition. Next, there are also sector-specific considerations.The emitting assets that different sectors use and/or produce as part of their value creation process and business model (for example power plants or cars) can have very long lifetimes, which means that a large amount of GHG emissions for the coming decades are already locked-in.

The emissions reduction targets need to incentivize companies to carefully analyse their existing strategies; across R&D, investment, production and sales; to understand to what extent they are locking themselves into unsustainable pathways. This might imply taking action now to stop those future emissions from being released into the atmosphere. Intermediate targets need to be mapped out all the way to the target endpoint, so that the targets are simultaneously an indication of the desired endpoint; the definition of a trajectory to get there; and an accountability mechanism to drive change in the short-term.

5.2.1 EMISSION REDUCTION TARGET ANALYSIS

ACT has tested all company targets to see if the company has the proper scope, ambition level and time horizon in mind when setting targets. For this, the methodology uses indicators 1.1-1.4 (link to Indicator table) in all 3 sectors.

Emissions Scope: Most ACT sample companies have targets within the scope of their emissions hotspots. This means that it is generally recognized where their most important emissions sources are and that companies are committed to reduce them. The exception is the retail sector, where some companies have not yet published targets for some important categories of emissions from their value chain, despite recognizing their significance.

Ambition: In terms of ambition level, each sector has companies that meet the required level of ambition with respect to their direct emissions. The average commitment gap[2] for direct emissions is 16%, which means that across all companies within the ACT pilot, implementing the average emissions reduction target for direct emissions is 84% of the way towards alignment with science-based requirements in 2020.

However, for targets that deal with value chain emissions, the level of ambition is not always equally strong. Many companies in the retail sector do not have an appropriate Scope 3 target, and as a result the average commitment gap is bigger at 51%.

Time horizon: The time horizon requirement of having a long-term target to set the transition endpoint is fulfilled by most ACT companies. However, the methodology becomes more sector-specific when checking whether the target endpoint aligns with the future emissions from the company's assets and/or products.

Time horizon is relevant for electric utilities, who have asset lifetimes that, according to ACT's analysis of the assets of pilot companies, can reach up to a weighted median of 30 years into the future. It is also relevant for auto manufacturers, whereby the geographically specific survival rate of cars was used to estimate the company's future emissions. In the case of the companies in this sector, on average, it takes to on average 2034 to reduce the fleet of cars sold in 2015 down to 20%. Both cases place additional weight on setting long-term targets.

Lastly, the requirement to have intermediate targets that set out a complete trajectory from present to endpoint, and drive change in the short-term, is not well implemented by the pilot companies. Companies generally have short-term targets, often accompanied by a very long term target, but nothing in between. Having a complete trajectory of targets can also be seen as an important element of the company transition plan.

2 Commitment gap is the difference between where the company wants to be in terms of emissions for a given future year and the level required by the use of the Sectoral Decarbonisation Approach when applied to that company for that year.

5.3 MATERIAL INVESTMENTS

Material investments includes all emissions that are produced through the future utilization of current assets the company has invested in the past. For the ACT Pilot, this means it is the primary module that looks at the direct emissions generated by company operations.

Through the forward looking principle, this emissions indicator is used to gain an understanding of the future emissions profile of the company. The below example of emissions lock-in shows how ACT uses data on a company's asset portfolio to do this.

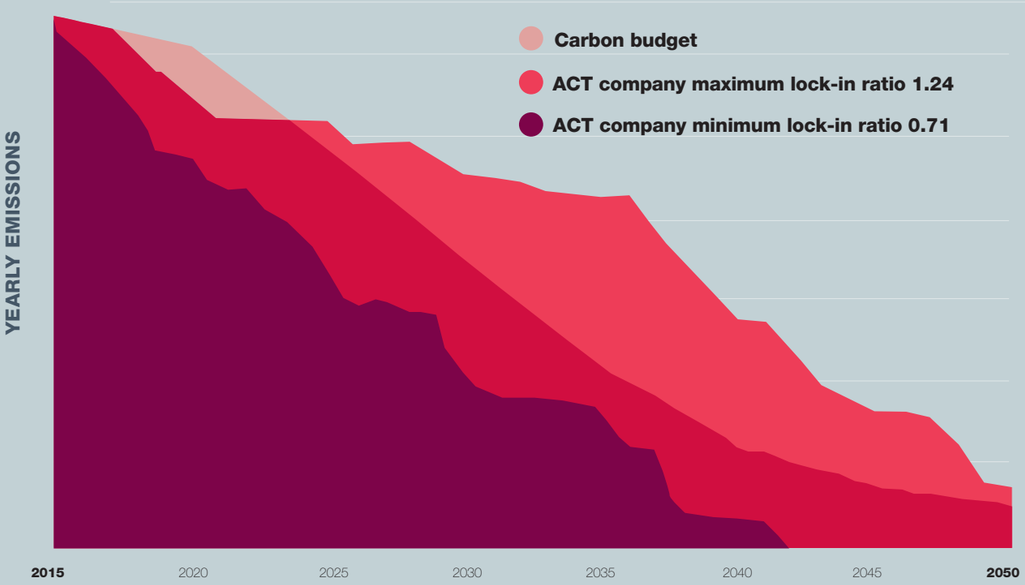
The weight assigned to this indicator depends on the relevance of the direct emissions to the total emissions profile. For example, for auto and retail companies, the majority of emissions is indirect (through use of the cars, or embedded in the products sold from the value chain). Therefore, this module may carry a low weight for these sectors, as indirect emissions are assessed in the *Sold Product Performance* module.

5.3.1 ELECTRIC UTILITY EMISSIONS LOCK-IN

ACT's indicators measure the emissions of an Electric Utility's current asset portfolio and benchmark them against a low-carbon scenario. One of the most heavily weighted indicators measures the degree of carbon emissions "locked-in" through the remaining lifetime of the portfolio and how this compares to the company's specific carbon budget.

Global carbon emissions between now and 2050 can be quantified into sector-specific carbon budgets that detail the absolute amount of emissions that can still be emitted by a sector during that time, if global warming is to be limited to below 2° as specified in the Paris agreement. Using the Sectoral Decarbonization Approach (SDA) [2], ACT has developed quantitative assessment models that derive a company specific carbon budget. This budget is the allowance of CO2 remaining to the company for the next 34 years.

FIGURE 29 **LOCKED-IN EMISSIONS TRAJECTORY VS. CARBON BUDGET**



Comparison of the act sample minimum, maximum and emissions budgets using the ratio scoring method

A power plant owned by an electric utility that is built in 1980 has a certain expected lifetime, or its technical lifetime. For example, if this is a coal power plant, this is 53 years. This power plant is then expected to generate energy and create value for the company up until 2033. The future generation between 2016 and 2030 will have a predictable quantity of emissions associated with it, depending on the active generation that this plant is used for.

As part of the ACT pilot, technical lifetimes and expected emissions were calculated for all power plants within the portfolios of all pilot companies This information was used to calculate locked-in emissions trajectory of each Electric Utility. In a "Business as Usual" scenario, these emissions would be unavoidable. However, if this results in more emissions than the company is assigned through its 2° aligned carbon budget, then there is a problem,

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which could result in having to close down power generation plants before their technical lifetime is complete in order to stay within the carbon budget. In carbon terms, these plants are stranded assets, which could also imply a financial loss to the company.

By comparing the locked-in emissions trajectory with the carbon budget, a lock-in ratio is computed. This ratio is set to 1 or larger if all of the company's carbon budget is already locked-in via the existing asset portfolio. Figure 29 shows the range of lock-in ratios for the ACT pilot companies: After decommissioning, it is assumed that all assets are replaced with zero-carbon generation capacity which does not further add to the yearly emissions.

Companies with a lock-in ratio larger than 1 may have to close down thermal assets before their technical lifetime in order to stay within the boundaries of a

low-carbon future. Conversely, companies with a lock-in ratio significantly lower than 1 have some more flexibility in the way they can transform their portfolio up until 2050, which is rewarded in the ACT assessment. Regardless of current emissions lock-in, maintaining business as usual emission levels of emissions would mean that almost all of the ACT pilot companies would lock-in their 2050 carbon budget within 5 to 15 years.

An encouraging development is that many companies within the sample have committed not to build any new coal-fired power stations. As coal is the single most emissions intensive form of electricity generation, this decision makes it more credible for these companies to stay within their carbon budget and to be able to deal with any carbon budget exceedance that currently exists[3].

ACTION NOW IS CRITICAL DUE TO LOCK-IN EFFECTS

In order for Electric Utility companies to weather the challenges of the transition to a low-carbon economy, they need to diversify and invest in low-carbon technologies. Strong transition plans are needed that encompass a long-term vision, and lay out a step-by-step trajectory to replace fossil-dominated generation capacity with renewable energy. Given long lead times to both shift strategy and make low-carbon investments, action needs to start right now in order to ensure that all pilot companies are on the pathway to the low carbon economy in 5, 10 and ultimately 33 years from now.

The ACT principle of prioritizing forward looking data has led the ACT pilot to explore the potential future implications of the company's current portfolio, which revealed stark differences between companies that, on the surface, may look very similar today. The ACT approach allows for an accurate assessment of the companies' readiness for the transition than limited information on their current emissions alone.

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5.4 INTANGIBLE INVESTMENTS

Companies invest not only in physical assets to drive their business model, but also in intangibles that are needed to progress the company's technology and drive change. Examples include investment in human capital as well as research and development.

Companies across all sectors have to invest in material assets in order to carry out their operations, and the companies' overall direct effect on climate change can be analysed through indicators that analyse the emissions from these assets. However, when developing a more forward looking outlook, intangible investments become very important. Under intangible investments, we define any large investment that does not translate directly into material assets (e.g. a power plant).

The only indicator that was developed in the ACT Pilot for this aspect is research and development (R&D) investment. R&D is included in ACT for several reasons:

1. To enable the transition, sectors such as the Electric Utility and Auto Manufacturing sector rely heavily on the development of low-carbon technologies to replace their currently high-emitting portfolio of assets. R&D is the principal activity action to develop these technologies.

2. R&D is also one of the principal tools to reduce costs of a technology in order to increase its market penetration.

3. Lastly, the R&D investment of a company into non-mature technologies for the future allows for a direct insight in the company's commitment to alternative technologies that may not currently be part of its main business model.

Not all R&D is directly in service of the transition to a low-carbon economy. The development processes that improve the efficiency of an internal combustion engine or coal power plant will help to reduce the emissions intensity of the future products, but the potential for emissions reductions in these technologies is only incremental. The transition models used in ACT prescribe a complete technology shift in order to achieve deep emissions cuts, which cannot be achieved by optimization of existing fossil fuel based technologies. Therefore, ACT used a definition of R&D including only 'climate change mitigation technologies', which meant those technology directions that lead to low-carbon assets, products and production methods.

ACT has sought to find out how much each company in the EU and Auto sector invests in R&D in these climate mitigation technologies. There are two more levels of granularity in defining exactly what 'mitigation R&D' means:

• Categorization of relevant technologies by the OECD Patent Statistics database, which has a taxonomy based on green patents. The ACT Assessment is not focused solely on patents, but has used the taxonomy.

• Defining different types of mitigation technologies as 'mature' and 'non-mature', based on their current real world application and cost-competitiveness. For example, large hydropower plants are an example of a very mature low-carbon technology, which means that the potential gains of doing R&D in this technology are not as large as in other technologies that may need more development to improve efficiency and reduce costs

5.4.1 MITIGATION R&D INVESTMENT RATIO

Ideally, this section would describe the methodology applied to implement the principles above and describe how companies were assigned a score based on how they are investing in climate mitigation R&D. However, the implementation of this has been very challenging, due to the difficulty in gathering the required data on R&D investment, whether from the company data request or from public sources. This section will discuss the possible reasons and potential solutions for this problem.

R&D METHODOLOGY

To align with the narrative of gaps that is also used in the indicators for Modules 1 and 2, the indicator is computed as the 'R&D investment gap'. To calculate this, a minimum capital expenditure % in mitigation R&D was used, taken from an integrated economy-climate model that defined out the relative global investment ratios required to reach a low-carbon economy across different technological fields [5]. Companies that underinvest, i.e. do not put in the same amount of capital as would be expected of them according to their total capital expenditure, will then not be able to reach this benchmark and will achieve a lower score in this indicator.

The basic reporting framework as explained below allows for the identification of R&D spend in particular technologies, and whether this is focused on mature or non-mature technologies. As defining what type of R&D is 'non-mature' is theoretically difficult, the classification is inversed, and done by **principle of exclusion.** This methodology assumes all R&D expenditure can be included, except when it is clearly spent on optimizing fossil fuel based technologies, or on those low-carbon technologies that are considered mature in terms of market position and levelized cost. For Electric Utilities, the only category of technologies that are excluded by this principle is spend on 'fossil fuel based combustion technologies', 'large hydropower' and 'nuclear fission' energy.

R&D INPUT DATA

Companies were presented with a spreadsheet that used particular relevant categories of technologies from the OECD Green Patent statistics database. Companies were asked to provide financial investment data over the last reporting year on how much capital was invested in a particular technology. This was a very granular approach. For example, for the Electric Utilities sector, the breakdown was as follows:

FIGURE 30 **BASIC REPORTING CATEGORIES OF EXPENDITURE ON DIFFERENT TYPES OF TECHNOLOGIES**

The numbers in front of the categories are taken from the OECD green patents framework.

Total capital expenditure in reporting year
Total R&D expenditure in reporting year
4.1 Spend on all aggregate renewable energy technology research (including R&D excluded from higher scoring levels)
4.3: R&D on fossil fuel based combustion technologies
4.1.7a: Spend on R&D in conventional hydro dams, turbines & waterwheels
4.4.1: Spend on R&D in nuclear fission reactors
5 Spend on R&D in Capture, Storage, Sequestration or Disposal of greenhouse gases

A full response to this data request would allow the assessor to combine the information on total R&D expenditure, total capital expenditure, and expenditure on mature technologies and fossil fuel based technologies, to identify what R&D is spent in the desired direction of non-mature mitigation technologies. The ratio can then be compared to the benchmark ratio for a score.

ACT also provided the companies with a more elaborate typology that provides additional technology types, which allowed for a more precise identification of the strategic R&D direction that the company is taking in its R&D. While the basic reporting table in Figure 28 asked for 7 data points, the advanced tables for EU and Auto asked for 20+ unique data points across specific renewable energy technology types. Please refer to the ACT Electric Utilities and Auto Manufacturing methodologies for the full details on this data request.

CHALLENGES

After testing out this implementation of using R&D investment data to try and calculate an investment ratio, the following observations can be made:

- Only a minority of the responding companies were able to engage with the data request and provide enough data so that the R&D investment ratio could be calculated. Reporting companies expressed difficulty in aligning their internal reporting systems with the OECD Patent typology.
- Reporting companies and methodology reviewers expressed concern that a focus on R&D spend only may not be an accurate measure of commitment to a future technology, or the company's effectiveness in developing said technology through R&D.
- The benchmark ratio used for determining the 'optimal level of investment' was taken from a global climate model, and this economy-wide benchmark may not have the required theoretical underpinning or may not be very strongly relatable to company expenditures.
- For the Electric Utilities sector, R&D may not need to be a strategic priority, as utilities are often not technology developers, rather they are users.

The small amount of data that could be collected, even among responders who were otherwise able to engage in detail with the other parts of the data request, meant that the current data request for R&D or indeed, the entire principle of asking for R&D investment data in this granularity, needs to be reviewed. In conversations with responding companies, several reasons were identified why companies found engagement difficult. The high granularity and imposing taxonomy used proved difficult to align with data companies had available internally. It was sometimes impossible to disaggregate internal data into, R&D which could be identified as contributing to the low-carbon economy, and R&D which would only benefit fossil fuel based technology. Many supporting technology developments, such as heat transfer mechanisms, would benefit both fossil fuel and low-carbon technologies.

The use of R&D investment data as the only indicator for the effect of the company's intangible investments on their low-carbon outlook can be disputed. Ultimately, it is not the amount that the company spends on R&D that defines how much these activities contribute to their low-carbon future. Ideally the effectiveness of those resources in bringing down technology costs and developing new breakthroughs would be measured. It was suggested by reviewers to look at patent registrations, or to delve deeper into the company's new initiatives to identify those projects that have made it past the research stage and show promise for development. Future iterations of the ACT Methodology should review the intangible investments indicators to identify whether these suggestions can be converted into effective indicators.

For the purposes of an assessment methodology a solid benchmark that defines where companies must be is required. It was difficult to find academic sources that could provide sector-specific capital investment ratios for low-carbon R&D requirements. Global climate-economy models have developed such figures for the global economy, in an attempt to formalize the demands that the low-carbon technology developments would place on the world economy. Ultimately, the capital investment ratios in the Ecofys-WWF Energy Report were used, because the sector granularity aligns with ACT. This report attempts to model global economic developments when the economy is to run on 100% renewable energy by 2050, including an R&D investment ratio for global capital investments. It is not detailed in the report how these benchmarks

were defined, and after communication with the report writers, the benchmarks were developed through expert consultation, but no more solid references could be obtained.

Finally, the measurement of R&D may not be equally relevant across the ACT Pilot sectors where it was applied. For the Electric Utilities sector, applying a sector-wide R&D benchmark is less credible than it is for auto Manufacturing companies, because the majority of R&D spend for the final product (electricity) does not always happen with the utility, but with the companies who design power production technologies. Especially for smaller utilities, they may focus more on implementation and optimization of a low-carbon portfolio rather than technological development. This is in contrast to car makers, who have a product which in almost all cases will require internal R&D in order to optimally change to alternative drivetrains. Because these drivetrains are still young it is not yet clear whether the optimal business model should be internal to companies, or external to the industry.

In the Electric Utilities sector, the existing industrial model of having large engineering companies develop power units is already established, which reduces the need for the utilities themselves to engage in technological innovation. It is a viable business choice for a utility company to simply take the best off-the-shelf technologies from large industrial partners and work on how to best implement them in their local environment and not have a significant R&D programme of their own.

MOVING FORWARD

Future versions of ACT may move towards more generic 'mitigation investments', which is a joint financial indicator that combines both the Research investments and Capital investments into low-carbon technologies. This is a higher level of classification which may make it easier for companies to report. It also has benchmarks, as the IEA has established for many sectors the general level of investment that is required to bring the entire sector to a particular technological level. This can be compared to other financial indicators such as general market capitalization for a sector, or general yearly capital investments, to generate a benchmark investment ratio that ACT can work with and is familiar with.

5.5 MANAGEMENT

For a company to transition to the low-carbon economy, strategic oversight and buy-in from the highest levels of decision-making within the company is necessary. For all sectors, a change in strategy and business model will be required. The presence of effective leadership and management is vital and indicates that a company is committed to the transition whilst increasing its chance of success. Even if companies are managing climate change at a board or equivalent level, a lack of expertise could be a barrier to the successful management of a low-carbon transition.

All sectors included in this pilot study will require changes to their business management to align to a low-carbon economy over the short, medium and long term. Whether this process is of a voluntarily nature, actively seeking opportunity, or is enforced only through regulation and structural changes to the market, is the result of strategic choices by the company. For a successful transition, it is advantageous that these changes occur in a planned and controlled manner, so that companies may stay ahead of anticipated changes that could heavily impact their future viability.

5.5.1 TRANSITION PLANNING

Transition planning is an evolution of strategic environmental planning. It details the choices that have to be made to transform the company, mapping out the pivot points in the company's operations that move it towards a low-carbon business model.

A transition plan is a clear and signposted strategy document that details which choices need to be made and on what timescale, so that the company may reach a low-carbon business model aligned with the requirements of the low-carbon economy, and emission levels compatible with its long-term science-based targets.

• The choices made are the most important elements of the transition plan, as they determine the path the company's mode of operations and business model is going to take from that moment onwards. For example, to produce a significant number of electric vehicles in 2020, Auto Manufacturers need to choose and invest in low-carbon technology years before in order to develop the technology, build capacity and build market share.

• The timescale defines the speed at which these choices are implemented. Ideally, the company can identify the low-carbon 'pivot point', which is the point in time (usually somewhere between 2020 and 2035) whereby low-carbon activities make up the majority of the company's sales. Other pivot points can be identified, such as in the investment strategy or in emissions, to link the transition plans more clearly to emissions reduction targets.

Ultimately, the low-carbon business model of the company should align with a post-2050 vision of a low-carbon economy. For example, in ACT we have used IEA's Energy Technology Perspectives roadmap for each sector, and expect companies to work towards the realization of this roadmap.

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ACT IMPLEMENTATION

ACT asked all participating companies for their low-carbon transition plan, and used a 7-dimensional maturity matrix to assess the company's strategic plans. This looks at the plan's short-term considerations (i), future considerations (ii), timescale (iii), measures of success (iv), level of approval in the organization (v), background analysis (vi) and financial content (vii). Not every dimension was equally viable and available. For example, financial content is rarely available within the current state of company transition plans, and future considerations are often much vaguer and undefined than those closer to the present moment. While many words can be written on analysing every dimension, the remainder of the chapter will focus on the timescale trends observed in company transition plans and targets, as this is very indicative of the current state of transition planning across the companies in all three sectors.

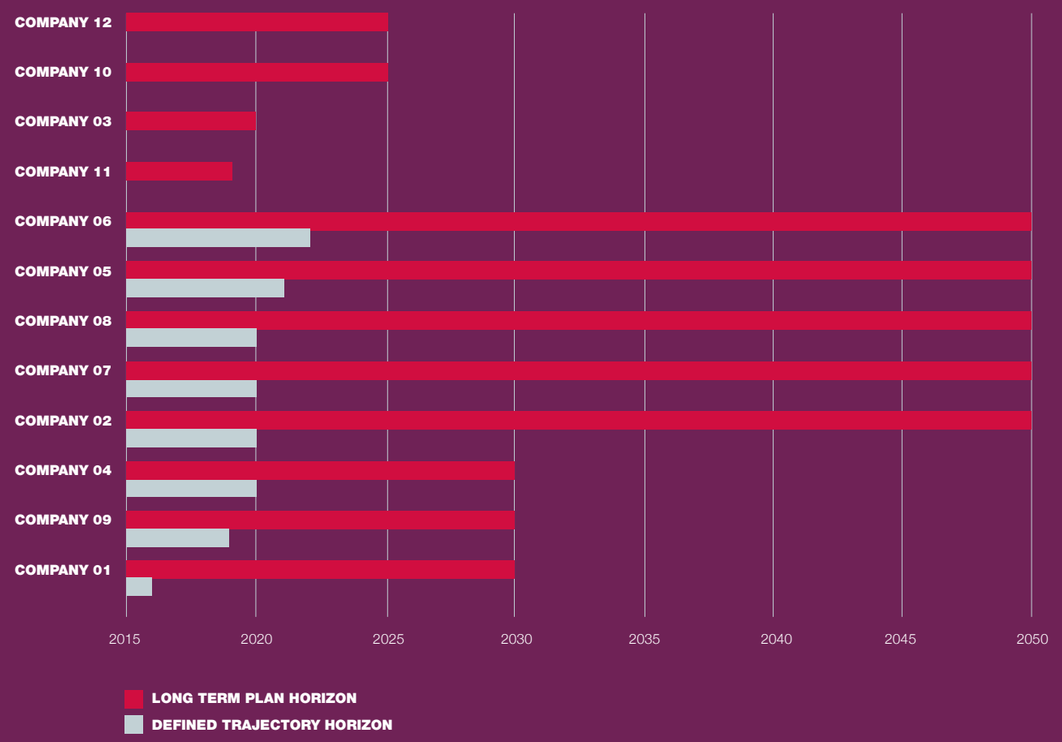
Figure 31 shows two data points from every transition plan analysed: The defined trajectory horizon, and the long-term plan horizon. The **defined trajectory horizon i**s the maximum horizon up until which the company has a defined transition plan with short-term targets, that does not skip important choices that must be made and the associated business pivot points. The long-term plan horizon shows the maximum timescale that is mentioned in the company filings where commitments have been made with long-term targets. For example, Company 8 has a defined trajectory horizon of 2020, and a **long-term plan horizon** of 2050. Between this is a gap of 30 years, for which the transition plan does not contain information on the choices that are to be made to reach the 2050 commitments for the low-carbon state.

In the ideal transition plan, the defined trajectory horizon is equal or close to the long-term plan horizon, which will mean that the company has the entire transition between the present and the post-2050 future mapped out in enough detail for all relevant choices and pivot points to be defined.

As is visible from Figure 31, There is a consistent gap between the defined transition plan and the company's long-term targets. Often, companies mention long timescales up until 2050 with ambitious commitments that promise near total decarbonization. However, no company in the ACT sample has defined their trajectory towards reaching this target, to go beyond 10 years into the future. This consistent transition planning gap among the pilot companies is made even more significant by the fact that for all three sectors, the medium term (2025 – 2040) is the most important for emissions reductions and thus requires the fastest pace of change, where the most important choices have to be made and business models will have to be pivoted towards low-carbon operations. The medium term will be the most turbulent and uncertain period in any company's future, but no company in the ACT sample has so far drawn up detailed strategic plans on how to engage with this challenge.

A correct implementation of emissions reduction targets with these requirements in mind is a very large part of proper transition planning, as it lays out the trajectory that the company has to take in terms of emissions.

FIGURE 31 **TRANSITION PLAN TIME HORIZONS**



SUPPLY CHAIN CARBON; AN ESSENTIAL MEASURE THAT IS BOTH PRACTICAL AND ROBUST.

The public expects companies to take responsibility for every type of impact in their supply chain. This principle, which has been firmly established through a long list of media controversies over recent decades, applies no less to supply chain carbon than it does to working conditions, treatment of children, forest management and or even the use of horse meat.
For most organisations, supply chains account for the largest component of their greenhouse gas emissions 'footprint' up to the point of sale, often several times greater than scope 1 and 2 emissions combined.
The monitoring of supply chain carbon is therefore an essential part of responsible business.

However, until now, the perceived difficulty of measurement has usually led to supply chain carbon being left to one side and sometimes dubbed the 'essential but impossible metric'. Why? There is a limitless number of pathways that contribute in some small way to the total supply chain emissions attributable to a company, product or service. It is simply not possible to count the carbon stage by stage and add it all up to get the total. Attempts to do so through often pain-staking process-based life cycle analysis, however carefully carried out, are undone in all but a handful of primary industries, by the 'truncation error": the inability to include the infinite number of pathways one by one.

But there is good news at hand. As with most management information, perfect data is not required. All we need a practical technique for making meaningful estimates that are good enough to allow well-founded, quantified hot-spot analysis. Environmentally Extended Input Output Analysis (EEIO) provides this. It is relatively simple for the company to use, methodologically robust and proven to work in companies from tech giants to supermarkets. It uses macro –economic modelling and company spend data to provide an estimate of total supply chain carbon along with hotspots by supplier and area of spend. It quickly provides a meaningful basis for both targeted action and more refined analysis. The latter can be done in various ways, all of which involve introducing elements of process-based life cycle analysis and actual supplier emissions data (as reported to CDP for example), thus creating a 'hybrid' company carbon model.

The approach outlined here is robust, impartial, and complete. It is a powerful, and increasingly widely understood tool for enabling effective supply chain carbon management in organisations. As with a great deal of management information, it will always contain a degree of uncertainty, and all of us who use it should be honest about this. What it provides, for all those who are serious about a low carbon world, is a basis for informed targeted action across the supply chain.
Mike Berners-Lee

5.5.2 CARBON HOTSPOTTING

Transition planning relies on scenario analysis, as laid out in the section above. However, as a precursor to such analysis, the company has to have proper understanding of the major emissions sources in its value chain, so that the proper parameters upon which the scenarios rely can be defined in advance. Some sectors are better able to define these emissions sources than others, and in the case of the ACT pilot, it was identified that the retail sector heavily relies on proper carbon hotspotting of this products, before the step can be made towards low-carbon scenario planning.

Therefore, for the Retail sector, ACT focused on this issue instead of requiring retailers to carry out scenario analysis. In order to calculate the embedded emissions of products, companies can use carbon hotspotting, whereby the life cycle of a product is assessed through quantitative emissions calculations. In order to get a product on the shelf, raw materials must be extracted and manufactured into products. These are then transported by logistics partners and often sold onto other buyers and sellers before they reach the retailer. The emissions that it takes to get a product to a retailer are therefore 'embedded' into the product and can make up the vast majority of the product's total life cycle emissions. A carbon hotspotting analysis can work

both across the product category as well as across the value chain to identify the most intensive products and value chain stages. While Life Cycle Analysis (LCA) of products is fairly costly for a retailer, there are several hybrid approaches that can offer a solution to inform decision making at lower resource costs.

There are several factors that the ACT pilot takes into account when assessing companies' carbon hotspotting methodology. One is that it is both measurable and repeatable. As a product's carbon footprint changes over time, retailers will need to regularly update their hotspotting data. Through this process new products can be accounted for and older ones removed. Another important factor concerns not the methodology employed, but rather how companies interpret their results and use this information to alter their future business plans. As carbon hotspotting highlights where in the value chain the highest emissions lie, retailers can develop interventions to reduce emissions at these stages. This data was assessed using a maturity matrix, which gave the pilot companies a score of between 1 and 5 for the maturity of their hotspotting process.

The results from our pilot study showed that the majority of our pilot companies had undertaken some form of hotspotting exercise. Of the 5 pilot companies analysed, 4 had undertaken a hotspotting exercise, and all companies scored highly for their procedure. Of the products that food retailers sell, meat and dairy products were often identified as the highest emitters, which is in line with our own understanding of emissions hotspots.

One factor that acted as a downward pressure on the scores for this indicator was that the pilot companies did not always disclose how their hotspotting exercise informed their business strategy. This is necessary to understand whether or not carbon hotspotting becomes an effective strategy to identify and target greenhouse gas hotspots to reduce emissions in the retail sector.

Owing to the perceived difficulty of a carbon hotspotting exercise, there is often anxiety from retailers to undertake an extensive procedure. However, hybrid approaches, such as using Environmental Input Output (EIO) model data can work as a solution to inform decision making at a lower cost. The ACT Product emissions mapping tool is available to companies that have not completed an internal hotspotting exercise. The tool links companies spend in product categories with emission factors from an EIO model, offering an alternative to costly hotspotting analyses. Of the companies that took part in ACT, 2 of the 5 used this tool. This demonstrates that there are several methodologies to approach this task.

5.6 SOLD PRODUCT PERFORMANCE

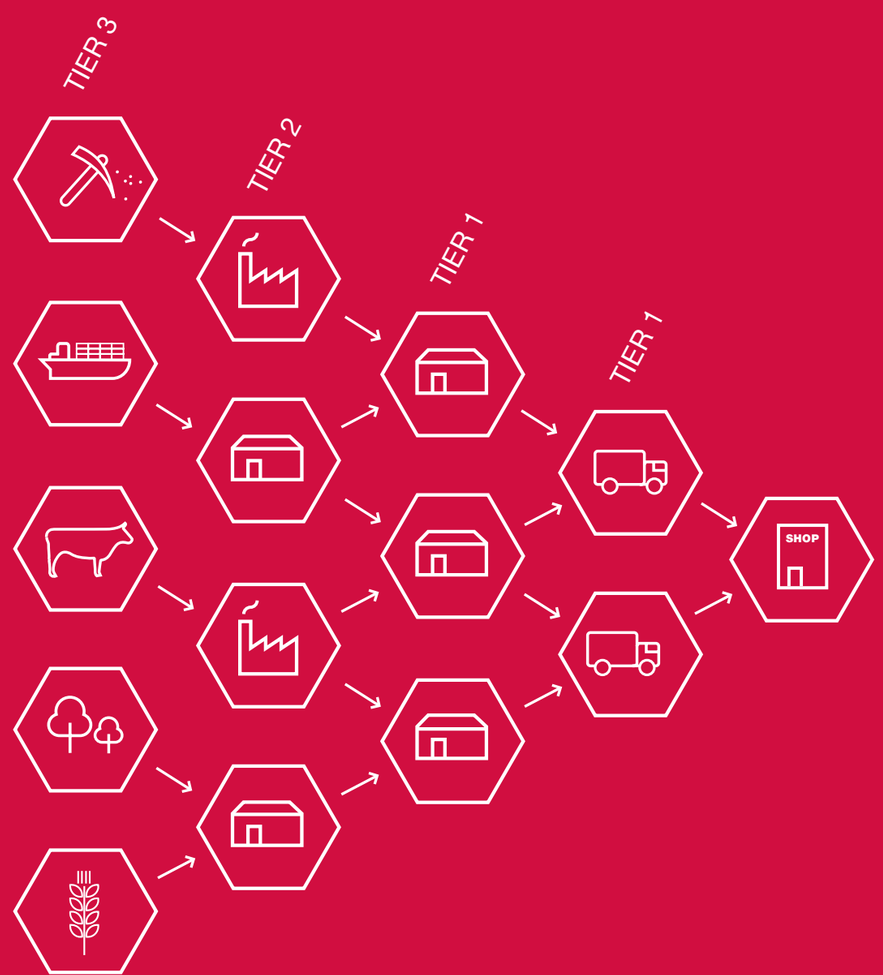
5.6.1 RETAIL INTERVENTIONS

Addressing emissions reductions in the product value chain is challenging. Difficulties in measuring value chain emissions cause the traditional measure – manage – reduce model of emission reductions to break down. ACT therefore focusses on the final step of this model, assessing actions companies are implementing to reduce sold product emissions. These emissions reduction initiatives are named "interventions" in the ACT methodology.

The vast majority of emissions produced from the retail sector do not come from retailers' own operations, but rather from various processes in the value chain. A retailer will sell products composed of raw materials that are manufactured and processed, transported between the source, factories and distribution centres, and delivered to the retail store or direct to the customer. For many products, this value chain is global and highly complex. As a result of this complexity the embedded emissions of the products retailers sell far outweigh any emissions a retailer may produce operationally. Although the potential to reduce emissions in the upstream and downstream part of the value chain is huge, so is the task of working with all the different actors involved effectively.

Obtaining emissions data for value chains is often difficult; because of their complexity and reach calculations must address questions of how to trace materials and account for carbon emissions resulting from thousands of economic transactions. ACT consequently chooses to assess the 'interventions' that retailers take to reduce value chain emissions. This avoids waiting for completion of a difficult measurement stage, and instead focuses the

FIGURE 32 **RETAIL SUPPLY CHAIN**



assessment on current action. Interventions are often collaborative in their approach, and involve strategies where companies exercise their market position and influence to reduce GHG emissions from the value chain.

Methods do exist to reliably estimate value chain emissions, especially for the upstream part of the supply chain. Environmental Input-Output (EIO) modelling combines a model of economic relationships in the economy with data on the carbon emissions from each industrial sector, and allows estimation of upstream emissions [6]. The ACT retail methodology assessed interventions targeting the product categories which are emissions "hot-spots". In order to assist companies which had not completed an extensive carbon hotspotting exercise, a simple tool based on EIO data to assess the supply-side emissions contributions of various product categories was developed. (Customer use and disposal may constitute a significant proportion of emissions from a product. However, measurement systems for these phases are not as mature for all products and were excluded from the scope of this tool.)

Supply-side interventions are illustrated by Figure 33. Information on an intervention provided by a company is assigned a score between 1 and 5, and the frequency of each score is displayed against how far each intervention reaches down the supply chain. Supply side engagement ranges from tier 1 to tier 3: Tier 1 represents direct buyer and seller engagement, which includes logistics partners; tier 3 is the deepest down the supply chain, which extends to the source; and tier 2 includes all stakeholders which are between tier 3 and tier 1, including manufacturers.

Scoring of interventions assesses the degree to which the intervention has achieved its likely potential for emissions reduction. The diagram shows that despite the majority of interventions targeting tier 1 and 2 suppliers, those interventions scoring well are more likely to target tier 3. This reflects that, firstly, while tier 1 and 2 interventions can be realised by engagement with one or a small number of suppliers with which a relationship already exists, tier 3 interventions may require new relationships with a large number of entities to be formed. Targeting a larger number of organisations brings a larger amount of emissions into the scope of the intervention, and a greater potential to reduce these emissions.

FIGURE 33 **RETAIL SCORE FREQUENCY AGAINST SUPPLY CHAIN TIER TARGETED**

SCORE	TIER 1	TIER 2	TIER 3
4	1	2	4
3	1	1	7
2	1	1	0
1	0	0	0

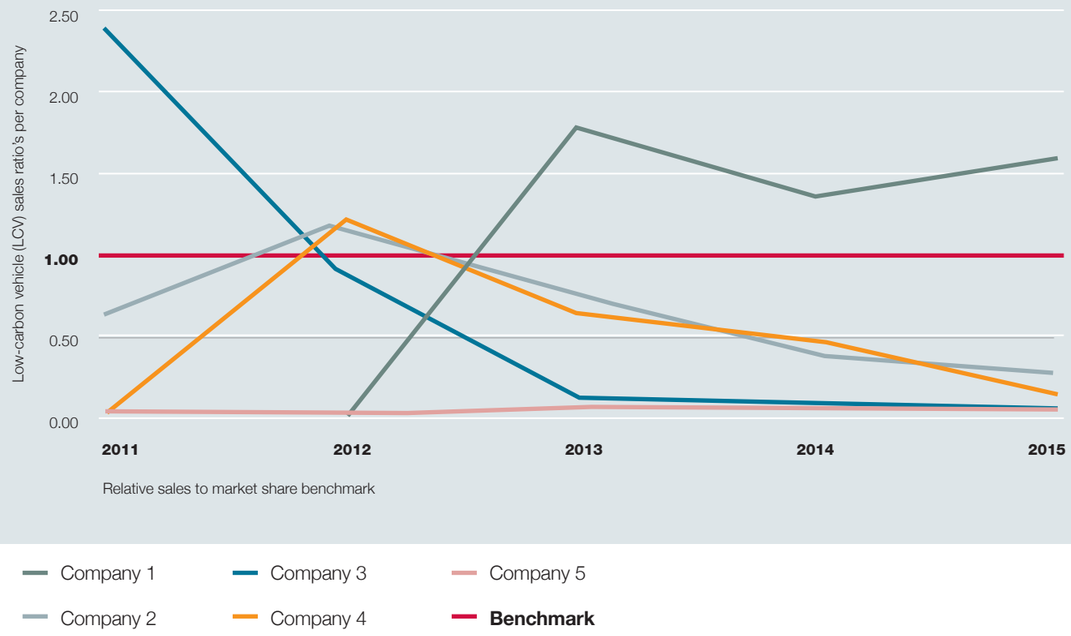
Secondly, products based on agricultural commodities are were often carbon hot-spots for the retailers assessed, and so were prioritised for reporting. Effectively reducing agricultural emissions requires going beyond direct collaboration with a small number of suppliers to work with a disparate range of producers, often via third-party organisations and alongside peer companies in industry coalitions. Some ACT pilot companies are effectively addressing the significant emissions from agriculture via shared accountability mechanisms.

5.6.2 SECTOR SPOTLIGHT: AUTO MANUFACTURING: LOW-CARBON VEHICLE SALES-TO-MARKET SHARE

A direct indication of whether auto manufacturers are moving towards the low-carbon economy is to compare the company's sales of low-carbon vehicles to its global market share.

The **low-carbon vehicle sales ratio** is computed by dividing the percentage of low-carbon vehicles sold by the company by its percentage of global market share of all vehicle sales. The benchmark is that the proportion of global low-carbon vehicle sales is the same as its global market share, which is expressed in the chart as a sales ratio of 1.00. If a company has reached this level, it means that its share of the low-carbon vehicle market is at least as high as its share of the total vehicle market.

FIGURE 34 **LOW-CARBON VEHICLE SALES TO MARKET SHARE**



A low-carbon vehicle (LCV) is defined as one which has a drivetrain that could potentially run for a significant amount of time without the use of fossil fuels. This commonly includes battery electric vehicles (BEV), plug-in hybrids (PHEV), and Hydrogen Electric Vehicles (HEV). It is important to note that this does not include traditional hybrids without plug-in technology.

Every year, the global market for LCVs grows, from 90,000 vehicles in 2011 to 450,000 in 2015, which means that leading companies have to grow their LCV sales proportionally in order to maintain their leadership status. Of the ACT pilot companies, most have been able to meet this benchmark at least at some point in the last five years, but at the last measurement point in 2015, only one company was selling as much as the benchmark required.

The IEA ETP models that the benchmark is based on require fast growth in the short-term future, with almost 6.7 million LCV sales needed in the year 2020. Observing the sales data, early market leaders have not been able to maintain performance and started lagging behind as the market grew. As low-carbon drivetrain technology is still immature, early iterations of the technology are quickly pushed out of the market by newer vehicles that provide greater performance at lower costs. It will take a continued commitment by auto manufacturers to rapidly develop new models in order to keep up with the technology development required for low-carbon transition.

5.7 POLICY ENGAGEMENT

The ACT Policy module asks companies for their position on globally relevant climate mitigation policies. Also of importance is the companies' official policy on dealing with trade association positions that are inconsistent with their own.

There are many multinational companies in the ACT pilot sample, and many of them directly engage with policymakers on shaping new environmental regulations. Even when a company operates in one country alone, the company's stance on local climate policy is an important indicator on what the company's views are on dealing with climate change.

The Electric Utilities industry is heavily regulated, although the amount and type of regulatory pressure depends on the market that the utility operates in. The development of regulation affecting the sector is usually done in a consultative fashion due to the need for technical inputs, which allows significant opportunity for influencing these regulations. Since the industry is currently a major source of emissions, effective and timely regulation is necessary to ensure that scientific limits are observed and that there is a "level playing field" for businesses in this sector to approach transition to a low-carbon economy.

The auto sector is subject to ever more stringent carbon emission regulations across almost all major economies, as governments try to increase air quality and reduce emissions from transportation. These regulations are made at international as well as national level, and there is significant lobbying effort by large carmakers. Car companies are often seen of critical importance to national economies, which gives these companies significant leverage with their respective governments. It is therefore vital that the companies have climate-positive positions.

Finally, although the retail sector is not shaped by regulation to the extent that some other sectors are, its ubiquity and influence within society mean that it is subject to a wide range of regulations and is an important stakeholder for regulators to consult with.

5.7.1 GLOBAL AND TRADE ASSOCIATION POLICY SUPPORT

The ACT Policy module was similar across all three sectors, with questions asked on the company's position on relevant climate policies, their policy on engaging with trade associations, and a question whether or not they are on the board or provide funding to those associations that have climate-negative positions. Almost all companies have received a high score for this module. It must be repeated that all ACT company responses are voluntary and that the companies who participated in the pilot are already known for having largely climate-positive positions. This question was taken from the current CDP questionnaire, and although the scoring criteria were made more demanding, this did not negatively influence the scores very significantly.

The question *"Whether the company is on the board, or provides funding to, trade associations that have climate-negative positions,"* is one of the few 'negative indicators' in ACT. This means that this indicator does not impose a certain benchmark and then assign a value to the company answer to compare it. Instead, it uses an 'exclusion principle' that says that it must be proven that the company does not do something, instead of having them *do something.*

This last principle is not ideal in voluntary disclosure because it requires perfect information on the company's engagements. It places the burden of proof on the assessor rather than on the responder, which is far from ideal. However, there is space for voluntarily disclosures to be complemented by media and other reports on company attitudes towards policy, which could provide enough information to nuance the specific judgment made by the assessor.

5.8 SUPPLIER AND CUSTOMER ENGAGEMENT

Value chains are often highly specialised and complex. A significant part of emissions lies in the value chain. Supply chains are critical levers for action, as GHG emissions can be many times a company's operational scope 1 and 2 emissions. Therefore, they are a key element of a company's climate-related mitigation, with the potential to collaborate with suppliers to reduce upstream emissions sources and additionally reduce downstream emissions through the marketing of low-carbon products to customers.

5.8.1 SUPPLIER AND CUSTOMER ENGAGEMENT ACTIVITY

Supply chains must be resilient systems that account for regulatory risk, minimize adverse contributions to climate change, and adapt to climate change-related disturbances ranging from resource scarcity to infrastructure damage from extreme weather events. It is vital that retail companies have strategies that attempt to deal with adaptation issues as well as strategies for emissions reductions to mitigate climate change.

Greenhouse gas emissions from a supply chain are produced via upstream processes before a product reaches the retailer. However, a significant part of emissions associated with retailers lies downstream with the use of sold products. As the interface between companies and customers, retailers are expected to take an active strategy to influence customers' direct preferences. As retailers are one of the few actors in the economy with the potential to alter customer decision-making, they will need to leverage their influence in order to facilitate a successful transition to a low-carbon economy.

Although it may be seen as double counting to include both the interventions approach and supplier engagement analysis in the ACT assessment, there are several reasons to include both these modules. It allows for a holistic and more specific assessment of a company's activities outside of the bounds of product categories, and due to the experimental nature of the methodology of module 3, it gives the assessor another angle in case module 3 results are insufficient for assessment purposes.

Due to the limited availability and complexity of data, direct measurement of supply chain engagement activities is not always feasible. Therefore, these two modules were assessed by means of a maturity matrix, which allows the assessor to consider multiple dimensions and compound them into a single score. Both customer and supplier engagement had the same average score across the 5 companies, of 60%. Although these were some of the highest scores in the retail sector, they still represent a low score and a low maturity for these modules. Value chains emission reduction is a fairly new concept for the retail sector, which is most likely the predominant reason for this low overall score.

Highly scoring customer-side initiatives included environmental labelling, whereby products display labelling incorporating their upstream CO2 emissions, electricity consumption and water usage. This type of strategy seeks to educate the consumer, thereby actively changing consumers' purchasing patterns towards low-carbon products. In comparison, lower scoring strategies were more reactive, in that they did not seek to alter customer preferences - for instance offering a larger selection of low-carbon products without reducing availability of high emitting products.

It was found that, in general, the pilot companies only engaged with a low percentage of their suppliers. Those that collaborated with a high proportion of suppliers to reduce their value chain emissions were only focused on own-brand products. For the sector to transition to a low-carbon economy, different stakeholders will need to be engaged, including those from different brands.

An interesting observation from the comparison of the two modules was that ACT pilot companies that scored well in their supplier engagement often scored lower in their customer engagement, and vice-versa. This indicates that the pilot companies often focus their strategies on a particular area of their value chain to reduce emissions: either upstream or downstream. However, pilot companies will need to take a more holistic approach to value chain emissions reductions in the future.

5.9 BUSINESS MODEL

For a company to successfully transition to a low-carbon economy, their business model must be future-oriented and able to thrive within the constraints posed by doing away with fossil fuels. For different sectors, the developers used future roadmaps developed by scientists and industry experts that analyse which directions the sector could take in the short and medium term, such as flexible decentralized renewable energy generation for electric utilities, and the circular economy for retailers.

5.9.1 RETAIL IMPLEMENTATION OF BUSINESS MODEL DIRECTIONS

The business model indicators for the retail sector assess whether the company is implementing concepts from the circular economy into its current and future business model. A shift to a circular economy business model will reduce GHG impacts through reduced resource use and reduced waste, but many of the design principles and structural changes required will also allow for reduction in GHG emissions.

The business model indicator aims to identify relevant current business activities which the company is participating in. In order to gather data, companies were presented with a table with prepopulated categories of activities that relate to a particular aspect of the circular economy. For the Retail sector, these were:

- Product design for the circular economy
- Circular economy and reduced GHG impact consumption models
- Establishing the reverse cycle infrastructure for the circular economy
- Developing structural enablers for the circular economy

Retailers were presented with 4 tables, one on each of the main categories, with many further sub dimensions to choose from. For example, under ‘establishing the reverse cycle’, one option was the establishment of take-back infrastructure, so that the retailer acts as the interface between consumer and producer on the product’s return into the circle.

The business model indicator was assessed by a dynamic maturity matrix, whereby strategies were compared against one another in order to generate a score of 1 to 5, 5 indicating the low-carbon aligned business model direction. Through the dynamic maturity matrix approach, each business model activity that the company reported was assessed on a number of fixed dimensions, and then the assessor determined the maximum ‘potential emissions reductions’ that the retailer could achieve by acting in the particular business model space. Their rating is dependent on how much of this potential was being fulfilled by the current implementation of the business model activity.

For a company to score highly, it must have integrated the circular economy into the products it sells, and reduced greenhouse gas impact in their consumption models. It is expected that a company pursues a futureproof business model and integrate that in their strategic plans. The description and evidence of the company’s degree of activity in one of the future business model areas was assessed for the presence of best practice elements and consistency with the other reported management indicators.

The results for the indicator revealed an average score of 52.5%, which was one of the lowest scoring for the Retail sector. However, the range was large, with the highest scoring company achieving 70% and the lowest 40%. The high range indicates a lack of consistency across the pilot companies with regards to their business models. One of the most common strategies employed by pilot companies was consumer-focused recycling, which included offering recycling boxes in stores, for instance for batteries and packaging, and encouraging consumers to use them. These recycling strategies often varied in success, owing to factors such as geographical range, among others.

The strategies outlined by the ACT pilot companies demonstrate that they are becoming increasingly future oriented, with new business model strategies that encompass the circular economy. There is a growing awareness of the need to integrate this in order to address value chain emissions and therefore transition to a low carbon economy. However, as demonstrated by the low average performance score for this sector, there is still a long way the pilot companies need to go.

5.10 CONCLUSIONS

LEADING COMPANIES ARE READY

ACT methodology development aimed to recalibrate assessments of company climate performance towards a benchmark that is fully aligned with the requirements of the low-carbon economy. The pilot learnings show that leading companies are achieving this ambitious level of alignment in certain areas. Although none of the companies assessed have proved to be already aligned with all of the requirements of low-carbon transition, the fact that these examples of excellence already exist shows that the steps necessary for transition to the low-carbon economy are achievable in practice. The challenge for all companies is to strive to reach a consistent level of excellence across all the areas of the ACT assessment. The companies spotlighted have shown that leading companies across different sectors are ready for the transition to a low-carbon economy. In many cases, these transitions are already underway, with companies starting to change their business models and strategic plans towards a 2° alignment.

IMMEDIATE ACTION IS REQUIRED DUE TO LOCK-IN EFFECTS

There is an immense journey still to be taken to decarbonize value chains that are predominantly powered by fossil fuels. It will take time to turn around into a different system using decarbonized energy sources. As the economy grows and business as usual continues onwards, the inertia pulling back towards the current modus operandi increases while the time remaining for a successful transition to the low-carbon economy reduces. This increases the demands for both the scale and the speed of decarbonization, making it harder and harder to change the longer action is delayed. The challenge is therefore to activate companies in all economic sectors to recognize the necessity of immediate action. Companies have to be able to evaluate their position with respect to the low-carbon economy in a way that is not only connected to the emissions of today, but also to all relevant choices made in the past and the present that have an effect on the possibility of reaching a desirable future.

TRANSITION PLANNING IS AN ESSENTIAL TOOL

To have confidence that companies will actually reach this low-carbon future, the path ahead needs to be scouted. This requires companies to set out the trajectory, identify milestones and plan important turning points. This is transition planning, and it is the next step in strategic environmental planning. This is not about how the current business model can continue to exist while reducing climate impact; instead, it is about how the business model can be transformed. Using low-carbon scenario planning and deep knowledge of the company’s impact inside its own operations and indirectly via its value chain, transition plans can set out actions needed in order to minimize climate impact below what is required to reach a low-carbon world in 2050 and beyond, while retaining value.

BEYOND COLLABORATION: DEVELOPING SHARED ACCOUNTABILITY

In order to decarbonize the entire value chain within and across sectors, it is not enough for a company to simply look inward and be accountable only for the transition with in its own operations. Many dependencies exist within sectors and some sectors have most of their emissions embedded in their products. A successful and aligned transition here requires shared accountability, which is the means by which stakeholders within a system can go beyond collaboration to hold each other accountable to progress made. This is most relevant for sectors such as retail, with complex supply chains whereby actors have to rely on each other to make the necessary changes to products to reduce emissions fast enough.

The ACT analysis has shown that across the indicators measuring alignment with low-carbon transition, there are examples of excellence demonstrating that the ambitious changes required are not only achievable, but are already being implemented by leading companies. The company that is fully aligned with these requirements can take inspiration from all these examples and integrate them into a business model that can meet the speed of change required in the next five years.

6 ACT assessment process and reflection

To aid future developers of ACT methodologies, this chapter presents the main learning points from the assessment process in the ACT pilot. As many of the innovations, processes, data points, assessment methods and modelling techniques employed were experimental, not every part of the ACT assessment can be regarded as equally successful. ACT has placed itself at the forefront of environmental reporting, often asking companies about concepts and for types of information that they themselves had not previously considered.

CHAPTER ORGANIZATION

The reflection chapter has three main sub sections:

1. Reflection on the ACT data collection infrastructure. The data collection process has been split out of the main reflection, as the process of gathering the detailed amount of data from companies has been a valuable learning experience that warrants its own detailed look.

2. The reflection on the assessment methodology. This will describe the difficulties encountered in developing and/or assessing certain indicators, the strengths and weaknesses of the methodologies overall, and the main take away points for the development of future ACT methodologies or improving the existing ones.

3. A reflection on the quality assurance process on the methodology development, as carried out by ClimateCHECK.

6.1 REFLECTION ON ACT DATA COLLECTION INFRASTRUCTURE

6.1.1 ACT DATA COLLECTION

A large amount of information and quantitative data is required on each company to calculate and/or assess the indicators, as well as to gain a holistic view of a company for the overall assessment dimensions. The following are the principal data sources used to gather this information:

1. ACT Data request to participating companies, to be completed in the online Collaborase platform, or through excel files for large amounts of quantitative data.

2. Company publications that may hold relevant information even if they are not included by the company in the data request.

3. CDP questionnaire data, which was already provided by many of the ACT pilot companies and had several points of overlap with the ACT data request

4. Public asset databases, notably GlobalData and Enerdata for Electric Utilities, and WardsAuto/other online sales trackers for Auto Manufacturing

5. External news and analysis sources to gather information on the company's reputation and those events that may harm their credibility in the low-carbon transition.

6. Global climate models and their metadata.

ACT DATA REQUEST

The company data request is completed in the online platform Collaborase. Each company was asked to provide answers to questions that were linked to the modules that ACT looked to calculate and assess. This is a questionnaire format very similar to the yearly CDP questionnaires, and indeed, CDP questions which are also used in ACT are included in the data request. Where companies already provided suitable data in response to a CDP questionnaire they were able to refer to this, or they could choose to supplement it with additional detail or provide new information. In addition, a detailed reporting guidance document for each question was produced that helped the company in what type of information was asked for, with examples where necessary.

See Figure 35 for a snapshot of the data request summary for Electric Utilities on the Management section, for the questions on transition planning and climate change scenario testing. This data request summary is a document shared with all companies that gives an overview of the data points; these are then asked for in more detail in the online platform. Data points in with a red marker are the minimum requirements, also known as that which shall be reported, and the optimum requirements marked blue are what should be reported. In general, the company can only be positively scored on an indicator if they submitted at least the minimum, red data points.

FIGURE 35
ACT DATA REQUEST SNAPSHOT (RED)

ACT EU 4B TRANSITION PLAN AND CLIMATE CHANGE SCENARIO TEST
The following information is used to access indicators EU 4.3 and EU 4.6

ACT EU 4.F The reporter shall provide the following details on the organization's low-carbonization transition plan.

A text description of whether a low-carbon transition plan has developed, or if there are any plans to develop one.

If yes, the reporter should provide the following description of the transition plan including the following details:

Whether the transition plan exists in a documented form and whether that document is public.
How the results of scenario testing influenced the transition plan.
Timescale for implementation of the transition plan.
Who has responsibility for its implementation (at the strategic, not operational, level).
How successful implementation of the plan will be measured and monitored. Should include details of any linked targets, emissions reduction or energy efficiency targets, or KPI's.

Companies should also submit documents that provide evidence of the details reported on the transition plan.

ACT EU 4.G The reporter shall provide the following details on the organization's climate change scenario testing.

A text description of whether any type of low-carbon stress testing has been undertaken or is underway.

If yes, the reporter should provide the following description of the stress testing procedure

Describe type of testing completed.
What was the boundary and timescale of the testing/analysis?
Describe Methodology, including what the changes in conditions considered were (what conditions and how did they change) and how were they combined.
Did the analysis include any stress testing (assessment of the financial impact of a sudden adverse event)?
Are results public? If not, what form do they take (quantitative/qualitative).
Summarize results, how were they reported.
Who are results reproted to?
Any changes to the strategy or business model as a result? Describe major changes.

Companies should also submit document or documents providing details of the procedure and results of the scenario stress testing, if these exist, and/or related relevant documents which include the details above or other information relevant to the climate change scenario stress testing.

ACT RT 2.0 The reporter shall provide their provide their transport activity. The Scope 1 intensity metric for transport is gCO2, per unit of freight, per unit of distance.

Guidance: To calculate transport emissions, the common GHG accounting principle uses the amount of fuel purchased by the company. While this is a very accurate measure of Scope 1 emissions, it does not provide insight into the carbon intensity of transport within the company. For that, infomation is needed on the total distance travelled, and the load factors of the vehicles (average weight of cargo during travel) used.

A good resurce for intensity based reporting is the UK government reporting guidance:
This guidance will be made more specific to ACT in the collaborase platform.

The reporter can report this activity data in several ways
If the company already calculates the emissions per tonne kilometer (or using other units of weight/distance), then that can be directly provided.

Option 1 *Carbon intensity of freight transport:*
2015 in gCO2 per tonne kilometer or tonne.mile
2014 in gCO2 per tonne kilometer or tonne.mile
2013 in gCO2 per tonne kilometer or tonne.mile

If the company does not yet calculate this metric and thus cannot provide Option 1, then the reporter shall provide data on the total ditance travelled by transport vehicles owned by the company, and the average load factor of the vehicles during transit.

Option 2 *Total distance travelled by transport vehicles owned by the company*
2015 in kilometer or another unit of distance
2014 in kilometer or another unit of distance
2013 in kilometer or another unit of distance

Average load factor of the vehicles owned by the company during transit
2015 in kilograms or another unit of weight
2014 in kilograms or another unit of weight
2013 in kilograms or another unit of weight

Some questions, such as those for emissions reduction targets, or for emissions from power plants, required large numbers of quantitative data points. For this, the online questionnaire format was not deemed effective, and instead the companies were asked to complete a set of excel files. For example, see Figure 35 for an example of data points on transport activity for retailers, that were to be completed in an excel file.

COMPANY PUBLICATIONS

The company is asked at various points within the data request to attach the relevant company publications or internal documents that could contain the information asked for. This is done both for informational purposes, as well as to increase the verifiability of the data. At the assessment stage, the assessor will take into account all information provided in these documents. Second, the assessor may choose to do his or her own research into company publications that were not provided directly through the data request, in order to answer certain questions during assessment and gain a more complete picture.

CDP QUESTIONNAIRE DATA

The main starting point of the ACT Data request is the CDP questionnaire. To reduce reporting burden for the pilot companies, the developers preferred data that is already reported and therefore already integrated into many responders' data collection processes. This has mostly impacted the information requested for the qualitative modules on Policy engagement, Management, Supplier and Customer engagement. Responders were partially or wholly able to refer to their CDP response if it was deemed appropriate for meeting the requirements of the ACT scoring methodology.

PUBLIC ASSET DATABASES

In order to accurately model the emissions of companies into the future, ACT's integrated assessment models require information on the entire asset portfolio of for example an electric utility company, or multiple years of production data by technology type for an auto manufacturer. As this is a considerable reporting burden for the company responder, where possible public data sources were used. For the Electric Utility sector, all asset level data was taken from the GlobalData database. This was then sent to the responding companies who were able to validate the data and provide corrections where needed. For Auto Manufacturing, public and commercially available database options were explored but were not used. Either the level and type of detail provided was unsuitable or they were found not to be cost-effective for the pilot phase for the level of additional data provided.

EXTERNAL NEWS AND ANALYSIS SOURCES

Next to the data and publications by the company, the analysis done also extends into external sources that provide credible information about the company's actions. The principal data source for this is the RepRisk platform, which systematically collates news articles about events that relate to companies in a way that could harm their reputation and credibility. This is used as a control tool to understand if companies have not undertaken any actions in their recent past that clash with the ideals of the low-carbon economy.

GLOBAL CLIMATE MODELS AND METADATA

In order to build the integrated assessment models and make companies comparable, ACT uses information from global climate models on certain important assumptions. For example, the emission factor of electricity generation plants is taken from the IPCC WR3 (2014) assessment, if the company did not provide emissions that belong to a certain generation type.

6.1.2 RESPONSE TO COMPANY DATA REQUEST

As a vital part of the ACT process, it is necessary to evaluate how well companies responded to the questionnaire. This information will be used to assess the difficulty of obtaining a particular type of information, and alter the data request for the next phase of ACT. In order to assess this, each company data request was evaluated with respect to its completion on a scale from 1 to 5, with 5 being the highest rating for a full response. This is similar in approach to CDP Disclosure scoring.

It should be noted that there is no need for a direct correlation between this quality of response rating, and the actual average score for the different modules in each sector. This is because in many cases the assessor was able to obtain data from secondary sources in order to gain sufficient information. Also, not every part of the data request was equally used for the performance scoring.

The information that was obtained from this can be displayed on a radar diagram, where it is possible to visually compare each sector to one another, particularly with regards to the modules that are shared across the three sectors with similar indicators, such as Targets, Management, Policy Engagement and Business Model Direction. Of these, the Electric Utilities sector had the highest response quality, whilst the Retail sector consistently had the lowest. This may reflect the way in which the Retail sector's questionnaire was angled towards monitoring value chain emissions which, in many cases, has only been a recent consideration for companies. In contrast, the Electric Utilities sector only had to report on data on direct operations, though the high average grade could also reflect how established strategies to mitigate climate change are within the industry, as energy has long since been a focus of national and international climate policy.

FIGURE 36 **RESPONSE QUALITY RADAR FOR ELECTRIC UTILITIES**

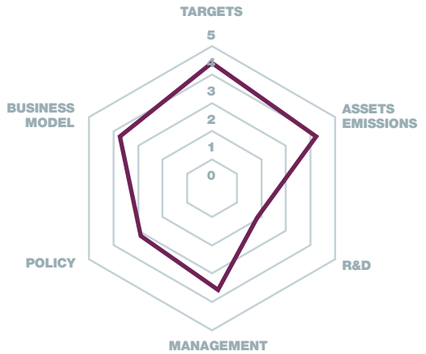


FIGURE 37 **RESPONSE QUALITY RADAR FOR RETAILERS**

ELECTRIC UTILITIES

As indicated by figure 36, the Electric Utilities companies' quality of data response was consistently medium to high. However, as highlighted in the diagram, module 3 scored poorly, which outlines their low-carbon R&D investments. The majority of the pilot companies did not disclose any data on this module, which resulted in the low grade. In contrast, the Targets module saw companies fully disclose their data, which resulted in the near perfect reporting quality grade.

RETAIL

For the Retail sector, the highest reporting quality module was the Management module, graded well on indicators such as their incentives for the management of climate change issues, which were featured on the CDP 2016 Climate Change questionnaire. Despite some repetition, pilot companies that did not take part in the Climate Change questionnaire still managed to be graded highly in these parts, owing to the simplicity of the data request. In contrast, the lowest graded module was Sold Product Performance and Customer Influence - one downward pressure in particular being that companies rarely reported on how they make use of data regarding customer choices and preferences to reducing GHG emissions.

FIGURE 38 **RESPONSE QUALITY RADAR FOR AUTO MANUFACTURING**

AUTO MANUFACTURING

The auto manufacturing sector companies responded very well on certain modules, such as those related to their direct emissions, as well as on supplier management and targets. Auto companies, as experienced in CDP's scoring, have a strong grasp on their own emissions. There is also a relatively high integration with their supply chain, which means that on average the sector companies should be able to provide good information on how they engage with it. On the other hand, the data reported for fleet emissions is a clear weakness for the sector, which is unsurprising given the complexity, consistency and measurement issues that exist (see section 6.2.4.1). Lastly, it is of note to observe that the Policy module was answered poorly across all three sectors. This module was taken almost entirely from CDP, and therefore responders have likely not tailored their response to ACT but relied on their CDP response.

When comparing the relative importance ACT has placed on modules to the quality of response, it is noticeable that the modules with the higher weighting have often scored poorly. For instance, module 3 consists of 40% of the overall score for the Retail sector, however it is one of the lowest graded in terms of quality of response. This presents some difficulty in assessment, leaving the assessor to rely on secondary data. For the remaining two sectors, the Auto Manufacturing sector additionally achieved the lowest score in response quality for their highest weighted module. The Electric Utilities sector achieved a good score for their modules with the highest weightings, and a weak score for one of their lowest weighted modules. Again, this confirms this sector as the most consistent for the quality of their data response.

6.1.3 REFLECTION ON DATA COLLECTION PROCESS

6.1.3.1 CHALLENGES ON DATA FOR EMISSIONS REDUCTION TARGETS

ACT asked for information on emissions reduction targets, ultimately to model them alongside the company's specific climate scenario. To ensure comparability across companies, companies had to submit metadata related to the targets, such as:

• Activity metrics such as annual generation, annual vehicle output or total floor area, in the base year and current year.

To ensure comparability and fairness in the assessment, each company's target had to be converted to an intensity target. This ensured accurate assessment of the company's starting position and therefore the required ambition level for the targets in the assessment.

• Projected activity metrics for the target year, if possible (otherwise standardized GDP growth from OECD forecasts is used).

Fast growing companies may often project their growth rate to be different than standardized OECD country projections, and they may adjust their targets to match these expectations. It is therefore important that this information is also carried over into the assessment.

• Information on historic targets to assess the indicator on the company's past performance.

This was attempted to assess what the experience of the companies was with respect to setting, implementing and ultimately meeting emissions reduction targets. However, it was not communicated as clearly in the data request and very few companies actually reported on targets that were already wholly in the past. Ultimately it was decided that the reporting burden here does not justify the added benefits from the assessment, and the associated indicator was therefore dropped during the assessment process.

• Emissions from specific activities, such as logistics, in order to assess such targets using the relevant sector specific decarbonization pathway.

The Sectoral Decarbonization Approach works best for sectors with a clear homogeneous activity metric, such as electric utilities (energy) and auto manufacturers (passenger*kilometres). However, for heterogeneous sectors such as retail, there is not one simple activity metric that can be compared to the company's emissions across Scope 1, 2 and 3. Therefore, ACT allowed companies to report sub targets for specific activities, such as refrigeration leakage, transportation and renewable energy. However, the additional data burden for assessors and companies created by this increased complexity was significant. Each sub target requires appropriate activity metrics (such as information on the total weight * distance for logistics) in order to properly link these targets to the assessment models.

The majority of the targets set by the retail sector covered only direct emissions, and the weight placed in the assessments on those elements related to direct emissions is low. Ultimately, the level of effort spent by the developers in developing an emissions assessment model for the retail sector, and by the responders in providing data for it, is not proportionate to its weight in the assessment.

The Retail assessment places a much heavier focus on the actions and strategies and indeed targets that covered the value chain part of emissions. However, there is not often information available on specific homogeneous activities within the value chain to allow direct comparison to scientific decarbonization pathways with such high granularity. For following versions of ACT Retail, the developers should consider whether the additional data burden is worth having the ability to use homogeneous activity indicators. It allows for the use of more appropriate benchmarks, but that is only worth it if the relevancy of the indicators matches the level of effort required to build the models, gather the data and perform the assessment.

6.1.3.2 CHALLENGES ON USING THIRD PARTY DATABASES FOR ASSET-LEVEL DATA

Due to the potential burden on companies of reporting a large amount of asset-level data, alternative sources for it, including third-party databases, were used for ACT assessments. Companies were given the opportunity to validate the data on their own operations held by these sources, which sometimes revealed discrepancies and errors:

Overall database quality
There appeared to be no consistent quality in the accuracy of the information sent to the companies for validation. Some companies, in their own words, completely revised the capacity and generation lists, resulting in significantly different model outputs. The ACT assessment always preferred to use the data sent by the company. Other companies only made minor edits with minor impact on the model outputs.

Consolidation approach differences
One potential source of error is the consolidation approach used, which relies on information about the ownership structure of a particular asset. When the database used is not updated with the most recent information on ownership of assets, large discrepancies can exist between the database and the company's own understanding. Propagating a different consolidation approach through an entire asset portfolio can result in different generation figure in a database that is up to 25% off the figure reported by the company.

Data reported by the companies themselves was used for assessments. This included disclosures for the purposes of the ACT assessment, prior disclosures to CDP's reporting system, or information made public in sustainability or annual reporting or on company websites. Discrepancies were identified between some of these sources that were not always possible to explain by different boundary or consolidation approaches.

In addition to uncertainties due to inconsistent data, assessments had to contend with gaps in data from all sources that introduced inaccuracy into the assessment. Since the ACT pilot was a trial project conducted on a short timescale and by definition participating companies had little experience with the methodologies, such gaps and inconsistencies are to be expected. However, with additional rounds of reporting and assessment large improvements can be expected from learning effects.

The root cause of both data inconsistencies and gaps is likely to be the lack of demand from data users for good quality, comparable, complete and consistent information about company GHG emissions and climate performance, and a lack of scrutiny by data users over the information that is provided. This lack of demand is in turn driven by the lack of good quality data available. Improving data quality is dependent on improving company data collection and reporting, which will itself be stimulated by greater demand for and scrutiny over the data. Improvements in quality of reported data will go hand in hand with increased use of the data and greater demand for quality. ACT methodologies (and allied projects) have a critical role to play in catalyzing this virtuous circle, by influencing both data users and data collectors. The development of robust methodologies, accompanied with guidance for reporters and written with the verifiability of data in mind, is a major step to ensuring good quality, relevant data with which to assess company climate performance on a sector by sector basis. One of the aims for the continuation of the ACT project is therefore to develop and expand the "ecosystem" of data users, reporting companies, and supporting organizations who will disseminate the knowledge of ACT approaches more widely.

6.1.3.3 CONFIDENTIAL VS. PUBLIC DATA REQUEST
The ACT Pilot project operated under confidentiality of all data submitted by the company, as well as confidentiality on any specific company results. This meant that this report could not contain any information that could be attributed to a specific company. Instead, the report only contains aggregate or anonymized results in the sector analysis chapters. On the data response side, despite this confidentiality, many companies were still reluctant to provide information that would not otherwise be available in the public domain through their reporting systems.

Ultimately however, transparency about the data and the resulting indicators calculated from this data is a big element of the ecosystem that ACT wishes to promote. When upscaling ACT methodologies, it is likely that the data users may demand a greater level of transparency of the data submitted as well as the ratings and feedback reports that are produced. Often the most insightful elements from an ACT feedback report are the outcome of the indicators and the attached interpretation and assessment by the assessor. This is valuable information to both the company as well as other potential data users, to the point where it may be sensitive for the company to have this published in the public domain. Future versions of ACT methodologies will need to strike a balance between providing the necessary holistic picture of low-carbon alignment with the voluntary nature of the ACT disclosure process.

One option, given the urgency and importance of having this type of assessment, could be to make a trade-off between having a complete public data set, to accept non-public data on highly sensitive topics that bring a high level of insight to the low-carbon transition assessment. This would configure ACT ratings almost as "credit ratings", where the credit rating is publicly available but not all of the data behind it is.

6.2 REFLECTION ON METHODOLOGY DEVELOPMENT AND IMPLEMENTATION

The ACT pilot cycle involved the 24 companies who were engaged in the technical working groups, completing the ACT Data Request, being assessed against the ACT methodologies, and receiving a 10-slide feedback report that contained the output of all indicators.

6.2.1 TECHNICAL WORKING GROUP PROCESS REFLECTION

The Technical Working Groups were broadly successful and fulfilled the role originally intended by the project team. Some challenges were encountered; firstly, the geographic spread of participants meant that the whole group could not attend all meetings, although they were generally well attended. There were some technical issues with online systems, such as difficulties joining the web-conference system and online consultation platform for some participants. English was the working language for meetings, and for some non-native speakers this was a barrier to full participation in discussions.

A concern of the project team was that participation of company representatives could lead to a consensus being built around a more conservative position on climate action than was desirable or possible. The inclusion of external experts was intended to guard against the formation of such a consensus by bringing independent voices in. In fact, company representatives generally displayed a high level of ambition with regard to low-carbon transition and this was reflected in the debate. Participants were a self-selected group of professionals volunteering for an early stage pilot project about the development of new methods for measuring low-carbon transition. They therefore had already worked on their own approaches that they were willing to discuss, or had an interest in the development of new approaches. This common interest allowed productive debate within the groups. For future iterations, ensuring that TWG participants have an appropriate level of expertise and interest will ensure success.

Notable TWG contributions to the methodologies included flagging the need to use data and data formats that were already being produced by companies to cut down the burden of reporting to ACT. Retailers collectively agreed that a focus on value-chain emissions was relevant to ACT assessments, but raised that a lack of measurement approaches would be a barrier to quantitative assessment in this area. Auto manufacturers noted that the lack of an internationally standardised approach to emissions measurement, and differences in regulatory regimes internationally, could be a significant error source in assessments.

The voluntary and experimental nature of the pilot meant that it was an addition to the existing work of the participants, so time for participation was limited. Due to these constraints some companies were unable to proceed to the pilot reporting stage. Other companies were forced to withdraw from the assessment process due to team restructuring and a demerger in one company. Future projects should be aware that such external factors will affect participation. Resource constraints for pilot reporting also meant that in some cases, data reported was of poorer quality than one would expect for a more established program with a stronger incentive structure for participation.

The pilot project timelines determined the content for the TWG meetings. Since early work focussed around developing the ACT conceptual framework, this was the agenda for the early meetings, but was perhaps less relevant for the TWG participants as it did not have a concrete link to work within companies. The development of indicators progressed quickly once the framework was in place and more time for companies to comment on and discuss specific indicators would have been welcome. Since the ACT framework is

now developed, this problem should be less relevant for future ACT methodology development. However, the observation that indicators with direct relevance to company operations were easier for company representatives to comment on should be borne in mind and ample time should be dedicated to this phase for future projects.

The question of relevance also impacted investor analyst participation. The analyst representatives on the technical working groups were not very familiar with company practice and it was challenging for them to conceptualise how an emerging methodology could apply to their work. Once methodologies had been drafted, the response from investors was more positive as they were able to relate the product to their own potential uses. Investors participating in TWGs should therefore have a prior level of knowledge and interest in low-carbon transition for that sector to ensure that they benefit from the process and are able to contribute to it effectively. Investor feedback may be better gathered from direct engagement on completed methodologies rather than involvement early in the process.

Main learnings from the Technical Working Group process

TWG participation was vital to development of the ACT methodologies, and the TWG structure fulfilled the role envisaged by the project team. The reflections and insights of TWG members helped the methodology developers develop a product that met the needs of reporting companies, worked in practice, and reflected current developments in company climate strategy. Using a variety of online collaboration methods and outreach to TWG members ensured that they were able to contribute according to their level of interest. Improved scheduling and information sharing, plus a focus on gathering feedback on areas which are directly relevant to reporting companies are recommended for future iterations of ACT. The project team are extremely grateful to all the TWG members who donated their time and expertise to ACT.

6.2.2 ACT PILOT OUTPUT REFLECTION

The 8-page feedback reports contain all the relevant results of the ACT assessment for a company. Each company was presented this feedback report in a 30-minute presentation via web conference. The feedback reports themselves are confidential, but a template of the structure is available at the ACTproject.net website. The structure of the reports was as follows:

1. Company score and highlights
This showed the company score with the three elements; performance score, assessment narrative and trend score, and 3 to 5 short sentences that highlight the most important insights gained on the company with respect to its low-carbon transition alignment.

2. Company detailed module score
Each company is presented with a graph similar to what is presented in Figures 15, 20 and 25 in chapter 4, that details their individual module score and their weightings. The area of the bar chart is directly proportionate to the company's performance score.

3. Performance highlight
The company is presented with a detailed explanation of a key indicator in the ACT assessment for their company. For Electric Utilities, this is the emissions lock-in graph. For Auto Manufacturing, this is the low-carbon vehicle share, and for Retail, this is the assessment of value chain interventions. The assessor provides more details on how this was assessed, and what conclusions can be drawn from this particular indicator for this company.

4. Assessment narrative
The assessment narrative spans two slides of text that go into more detail why the company received a particular score on each performance module, as well as delve into additional dimensions that could not be captured by the scoring methodology. Finally, the assessment narrative extracts the key strengths and weaknesses of the company and suggestions for improvement.

5. Trend narrative
The third element of the performance score is presented. The supporting text is not as detailed as for the assessment narrative, and focuses on those observations that the assessor has made that can provide valuable insight on the short-term future direction of the company. The discussion is focused on both positive and negative points, and the trend narrative output is ultimately dependent on the overall direction of the insights gained.

6. Company specific performance highlight.
Most companies receive another performance highlight. This time, it is more company specific and focuses on a particular indicator that the assessor wanted to emphasize. For example, it could show a graphical depiction of the company's target and the gap that exists between it and its science-based pathway.

7. Data infrastructure narrative.
Finally, the final slide provides information on the data sources that were used to gather the information presented in the feedback report. It also details some specific notes about the process for the company, focusing on the quality of the data used, and highlighting which data points were unavailable and in what way this could have negatively affected the assessment.

Overall, the feedback reports were very well received by the pilot companies. Pilot responders expressed their appreciation for the high level of detail presented, and in almost all cases agreed with the insights and sentiments expressed by the assessor about their company.

Companies often expressed interest in receiving more detailed information about the calculation and assessment of their indicators, after having been shown up to two 'performance highlights' in the feedback reports. The preparation of the existing feedback reports after assessment is time-consuming, taking around a day, but there is a clear demand by the participating companies for detailed information on specific dimensions of their low-carbon transition. The development of a more structured output format for the ACT indicators, perhaps directly linked to the assessment models, that can provide consistently strong communications can be of high value to the responding companies, and could increase the value of ACT participation to companies dramatically.

This affirmed the ability of the ACT Framework and approach to gain a holistic insight into the companies' low-carbon transition credentials. ACT feedback reports often contained a level of granularity and value of information that can be of great help to the companies themselves, and this element of the ACT output should be highly valued and emphasized when making the business case for more ACT methodology development and large scale implementation with companies.

6.2.3 SECTOR-INDEPENDENT CHALLENGES ENCOUNTERED IN IMPLEMENTING THE METHODOLOGY

6.2.3.1 LIMITS OF THE SMALL SAMPLE SIZE

To have a real impact in bringing about low carbon transition, ACT methodologies will need to be applied at scale. This means that a greater number of companies within the Electric Utilities, Auto Manufacturing and Retail sectors need to be assessed against the methodologies already developed. It also means that additional sector methodologies will need to be developed. Although a big proportion of global emissions can be attributed to a relatively small number of high emitting companies in selected sectors, which makes them a priority for assessment, these companies cannot be divorced from the rest of the economy. Large companies are connected to a wider range of smaller companies by their transactions, and changing behaviors by companies and consumers to reduce emissions adequately depends on alignment of all economic levers. In economic terms, small and medium sized enterprises make up the majority of the economy of most nations, and so are critical to making emissions reductions at national and international levels. While large enterprises have global operations and impacts, global climate change action is organized at a national level. The articulation between international business actions to reduce emissions and its contribution to national level reductions must be addressed.

The ACT pilot companies were distributed globally but mainly located in the largest global economies. Achieving scale will also depend on bringing the project to smaller and developing economies, although such contexts will bring a different set of challenges for project acceptance and implementation.

6.2.3.2 TEMPORAL CONSIDERATIONS FOR THE CURRENT ACT IMPLEMENTATIONS AND EFFECT OF YEARLY RECALCULATIONS.

The ACT assessment models re-baseline targets to 2015, to ensure that all targets are judged from the same starting point, thus respecting the ACT principle of comparability. This is also a future-oriented approach, in that the action which remains to be taken from the present day is allocated between all companies in the economy. However, this implies no recognition or penalty is given for recent emissions reductions or increases, respectively, by any company.

For all sectors, the company's science based decarbonization pathway is recalculated with 2015 as the base year. This could mean that a successful emissions reduction programme in the past few years then necessitates a more ambitious science-based benchmark in 2020. This is because every year the scientific benchmarks used adjust for real market conditions, which means that companies who did well (i.e., better than the market) in the past have ever more ambitious pathways assigned to adjust for the market failing to follow in their wake.

This is not a problem that can readily be solved without letting companies choose their own base year, which is something that was deemed undesirable at the time for reason of fairness and equal comparison. It is also partly unavoidable, as in essence the failure of some market parties to meet the demands of the transition will mean that others will have to step up and do more to collectively reach the 2° world. ACT assessments should not disadvantage companies for that fact, rather it should encourage them. Some possible avenues to resolve these issues:

- Use a rolling average over multiple past years as the 'starting point' for the assessments.
This will allow a reduction of the effect of recent changes in emissions on the level of the decarbonization pathway, although it will not eliminate it completely.

- Add additional performance points for very ambitious action
Performance points could be awarded for moving and/or committing significantly beyond the 2 degree benchmarks, which in effect means the company is taking on the burden of correcting the failure of other market parties who are not aligned.

- Adding more past-relevant indicators to the assessment
Companies who are faced with a more ambitious pathway due to past action will, ceteris paribus, have a better score on this indicator.

- Interacting a past and future indicator to partly cross into the same 'score space'. This means that companies can negate a low score for the future-relevant indicator with a high score for the past-relevant one. However, this runs the risk of pushing the general scores of ACT upwards and makes it harder to calibrate the methodology. This upwards driving effect also may not satisfy the companies, as in the end the comparison with others is expected to be a major calibration for the responder, even if ACT philosophy is to have science-based benchmarks anchor assessments.

Finally, while companies can be disadvantaged by the choices made in ACT, they can also gain advantage from them. Targets with the majority of their time periods in the past will benefit from rebaselining recalculations in a way that they will seem to become more ambitious if the company continues to increase its emissions contrary to with their own target. Therefore, the current ACT implementation may result in a higher score for a future-relevant indicator if the company has recently increased emissions, and a lower score for that indicator if the company decreased emissions. This is a major issue that will need to be resolved through the evaluation of choices made in the modelling approach.

FIGURE 39 **STATIC MATURITY MATRIX**

BASIC	STANDARD	ADVANCED	NEXT PRACTICE	2° ALIGNED
Business as usual, no obvious action beyond the economic activity.	Recognition of responsibility and implementation of standard emissions reductions.	Industry benchmark of emissions reduction recognized as leadership level.	Next practice in climate change mitigation, showing signs of business model transformation.	Full leverage of potential options to reduce emissions across all relevant sources.

6.2.3.3 SCORING OF MATURITY MATRICES

Static maturity matrix
As explained in section 3.5.1, ACT uses static and dynamic maturity matrices to assess qualitative information. Above is repeated the table that outlines the levels of the static maturity matrix.

Overall this method of scoring succeeded for information that was specific and comparable across organizations. Splitting up the scoring across multiple dimensions also helped in this regard, as it allowed for the identification of more specific criteria. However, in the cases where information provided is less comparable, it can be hard to use a predefined matrix to accurately score information. For example, the supplier and customer engagement indicators used data from the CDP questionnaire on the company's engagements, as this question was made for CDP and answered not with the requirements of ACT in mind.

For future versions of ACT, two main recommendations can be made:

• Start with a loosely defined scoring matrix, and add more detail to the definitions of the matrix throughout the early scoring process, so that the matrix may be best adjusted to the available data.

• Allow for backwards adjustment of scores from companies who were assessed earlier in the process compared to later ones. This allows for learning effects by the assessor, as well as improvements to the matrix, to make the scores of companies assessed early on more accurate.

Dynamic maturity matrix
It can be challenging to define dynamic maturity matrices, as the task demands very knowledgeable assessors who are able to access the proper research as well as have enough general knowledge of sustainability and climate change mitigation to define the higher levels on the matrix. Individual assessors will unavoidably introduce an element of subjectivity in the scoring and different scorers may produce different results. To a certain extent this is the price of taking an interpretative, and thus highly flexible, approach to scoring, rather than a rigid rules-based approach. However, techniques exist to minimise individual scorer bias which were employed by the ACT project; such as shared training, cross-checking of individual scorers results, and a collaborative approach to scoring in marginal cases. More formalised approaches to minimising bias and divergence will need to be explored in large-scale implementations of the ACT methodologies. Furthermore, it is very reliant on the data quality submitted by the company, otherwise it becomes very hard to compare interventions across companies.

At the end of the process after all interventions and/or business model activities have been scored, there exists a set of scores between basic and 2° aligned for a set of interventions. These then need to be consolidated into a single score for the indicator. Initially, the ACT methodology simply averaged out the scores across all reported interventions. However, this creates an impetus for disclosers to only report on those interventions that are likely to have a higher score. This perverse incentive is not something ACT wishes to promote. Instead, the score could also be based on a set amount of highest scoring interventions. This will push up the average score, but is less likely to discourage companies from

reporting data. The ACT methodology did not further develop options to optimally solve this problem. Future ACT developers who wish to use these methods will need to spend time on drafting an equitable and fair method of deriving a consolidated score from a large amount of independent maturity matrix assessments.

Overall, the maturity matrix implementation in ACT allowed for a systematic assessment of very heterogeneous information, and the matrices can be adapted over time. Practices that are high level now can also be downgraded into the future. On the other hand, due to time constraints and the limitations of the timelines that the assessments and feedback reports were planned on, the ACT pilot assessments did not reiterate back towards the initial assessments, and there was no ability to downgrade/upgrade answers as the assessor acquired more experience in the responses of a particular sector. This would have been especially useful to calibrate the experimental dynamic maturity matrix scoring and is advised for future iterations of the project. Taking into account time for such reiteration in future planning of assessment rounds will allow for a better overall assessment quality. Now that the pilot phase has been completed, the information and scores gathered can also contribute to a benchmark to calibrate future scoring.

6.2.4 SECTOR SPECIFIC ASSESSMENT NOTES

6.2.4.1 AUTO COMPANIES AND INCOMPLETE FLEET EMISSIONS DATA

For the auto company assessment, by far the largest hurdle was incomplete reporting of fleet data across all relevant global territories. Companies were reluctant to report any data that was not already available in the public domain, such as data reported under national or international regulatory standards. It is well known that many of these measurements do not reflect real-world emissions as car companies optimize their cars to obtain the best test results [8]. Although some companies may use other types of measurement methods internally to obtain comparable performance data for their global fleet, in it was often not possible to obtain this data, despite the confidentiality in the ACT pilot. This created additional complexity in the attempting to model global multinational companies according to a global benchmark, when the data submitted was measured using different methods and had different levels of bias. Future versions of ACT may incorporate research by the ICCT on conversion factors that compare different standardized vehicle emissions measurement methods, and also estimate the systematic error in these measurement methods compared to real world values [9].

6.2.4.2 R&D DATA REPORTING FOR EU AND AUTO SECTOR

Reporting issues related to R&D reporting had a large impact on the assessment as already discussed in detail previously in this report. This section briefly repeats the conclusions:

• Only a minority of the responding companies were able to engage with the data request and provide enough data so that the R&D investment ratio could be calculated. Reporting companies expressed difficulty in aligning their internal reporting systems with the OECD Patent typology.

• Reporting companies and methodology reviewers expressed concern that a focus on R&D spend only may not be an accurate measure of commitment to a future technology, or the company's effectiveness in developing said technology through R&D.

• The benchmark ratio used for determining the 'optimal level of investment' was taken from a global climate model, and this economy-wide benchmark may not have the required theoretical underpinning or may not be very strongly related to company expenditures.

• For the Electric Utilities sector, Research and Development may not need to be a strategic priority, as utilities are often not technology developers, rather they are users.

6.2.4.3 CHALLENGES ON USING PAST DATA TO PROJECT INTO THE FUTURE

The ACT assessment models attempt to project into the future, and the more years of data available on a company's past emissions, the more credible these projections become. However, the main issue identified here is the Influence of company boundary changes on the calculation and assessment of past-relevant indicators. The boundary changes that have the most impact are:

• Physical changes due to investments, acquisitions, mergers or divestments.

• Changing emissions calculation method between operational control to equity share or financial control.

Boundary changes due to significant changes in the asset base from investments and related activities do not necessarily create an issue. However, large acquisitions or sales of large groups of assets will have a significant impact on the company's average emissions intensity, to the point where the effect of emissions reduction activities and the investment in renewable capacity can be overshadowed. Therefore, care should be taken in the interpretation of large changes in emissions intensity.

By far the most impactful factor affecting the calculation can be boundary changes in the way emissions are calculated between different years. The issue has come up that one Electric Utility in the sample changed their emissions calculation methodology a few years in the past, in the middle of the 2008 – 2015 data period that ACT requires data for. This change in boundary was also not communicated to all other external data providers that ACT uses, such as Bloomberg. In this situation, the generation and associated emissions data provided by the company data request, the company's own filings, and what is reported in Bloomberg differed very significantly. This boundary change was also not sufficiently communicated by the company in their own reports. This significantly reduces the usefulness of the data, to the point that only the most recent information after the boundary change can be used. It is unlikely that in larger ACT projects, the assessor will have enough resource available to resolve such issues. Therefore, it is imperative that the reporters to ACT are informed of the importance of boundary changes and report them in their ACT submission.

6.2.5 STRENGTHS AND WEAKNESSES OF THE PILOT METHODOLOGY

The current version of the ACT framework has proven an effective path to developing three sector-specific methodologies, which have been successfully tested out on a set of large multinational companies. Primarily, it is laudable that ACT has the ability to provide a critical picture of the company's real performance in light of what is required to make a low-carbon world happen. From this experience, a concluding, concise set of strengths and weaknesses can be derived:

Main strengths of the ACT Framework and methodologies

1. Forward-looking nature of the project. The constant question 'how does this relate to the company's low-carbon future' has allowed for a viewpoint that identifies the maximum potential of future-relevant information that exists.

2. Scientific rigour. Every indicator, when possible, is linked to a scientific benchmark that translates the abstract requirements of global climate science to tangible goals that companies can interact with.

3. Collaborative process with companies in development. Expertise from within the sectors was key in identifying the indicators and relevant data points that were acceptable and viable to work with, while still being able to reach the goal of the project.

4. Balance between business interest and necessity of action. The principle of conservativeness on the side of 2° maximum temperature rise, whilst including companies in the development process, led to a focus on pragmatic business solutions that assist with low carbon-transition. ACT is neither pro-business at the expense of climate action, nor does it privilege climate action over the need of businesses to survive.

5. Open nature of indicator development. The ACT methodologies have brought forward many innovative ways of assessing and measuring progress against the future. This ability to do this was due to the open 'blue-sky' nature of the development process.

Main weaknesses

1. Detail of analysis may be hard to scale. The high level of detail and effort required to make the ACT assessment for each company may not be very scalable

due to the amount of time taken per company. Larger scale projects in ACT will need to look for compromises and a more streamlined assessment process in order to cut down on the time required to assess an organization.

2. Limits of voluntary nature. The ACT project required company executives to spend a significant amount of time in the development process as well as in responding to the data request. Given the landscape of voluntary reporting frameworks that already exists, companies may not be willing to structurally engage in more, especially when it is on a particularly complex level as ACT and requires many more different types of data.

3. No link to financial feasibility. ACT focuses on producing a metric of alignment with low-carbon transition, but does not incorporate a detailed test of the feasibility of such transition from an investment perspective. Financial analysis tools such as value-at-risk models could be combined with ACT models to give a more robust view of whether a company might lose value from transition and needs further adjustments to its strategy to avoid this.

6.3 ENSURING ROBUSTNESS: REFLECTION ON THE VERIFICATION AND QUALITY ASSURANCE PROCESS

6.3.1 ENSURING ROBUSTNESS: VERIFICATION & VERIFIABILITY, FRAMEWORK DEVELOPMENT

A key concern of the ACT pilot project was ensuring that the process for methodology development was robust and replicable and led to the development of robust methodologies. Ensuring transparency and openness with a consultative approach to methodology development via the project structures helped achieve this goal, as did making reference to reliable third party data sources and research. The 5 questions approach detailed above formed the basis of the "ACT Framework" which was developed as part of the pilot project scope. This was used to guide development of the three initial sector methodologies, and will also be used to guide future methodology development, thus ensuring consistency of approach into the future. Adding to these actions was the quality assurance process carried out by ClimateCHECK over the methodology development, which informed the methodology production through an iterative feedback process, and also highlights directions for future developments of the methodologies to ensure that they achieve their stated goals. The validation ensured that the methodology developers followed their stated processes, including the ACT framework and principles, to develop a robust rationale and research basis for the indicators chosen.

6.3.2 THE ACT PILOT QUALITY ASSURANCE PROCESS:

ClimateCHECK provided a separate quality assurance process over the methodology development, to make sure that both the methodologies developed and the process for methodology development was robust, credible and replicable. The intention was to give confidence to the end users of the methodologies and assessments that they would meet their needs. The quality assurance process ensured that the methodology developers put a process in place a framework and processes to guide methodology development, and then followed this process. ClimateCHECK also contributed guidance for potential future verifiers of the methodologies. This establishes a key requirement for quality reporting against ACT methodologies in the future, as it allows the possibility of a third party verification of company reported data.

6.3.3 THE QA PROCESS WAS DEVELOPED BASED ON GOOD PRACTICE GUIDANCE FROM THE FOLLOWING ORGANIZATIONS:

ADEME and CDP engaged ClimateCHECK as the QA Partner for the ACT Project. ClimateCHECK works with leading sustainability standards initiatives using the Collaborase online platform to design and deliver QA in support of innovative standards systems. The experts at ClimateCHECK have experience performing assurance on GHG assertions, assessing GHG validation and verification bodies seeking accreditation to ISO 14065, and methodology development and validation.
The QA process for the ACT Pilot Project was designed based on best practices established by leading standards organizations such as ISO and ISEAL. The QA process related to both the ACT methodology development process as well as each of the ACT methodologies, including the supporting documentation. ClimateCHECK performed the QA on the ACT Pilot Project in a transparent and thoroughly documented process using Collaborase.

6.3.4 DETAILS OF THE QA PROCESS FOLLOWED:

The ACT Initiative incorporated Quality Assurance (QA) as a major activity in the ACT Pilot Project. The QA process extended throughout the entire period of the ACT Pilot Project, starting December 2015 and until February 2017. QA activities in the ACT Initiative include:

A. following best practices (e.g. ISEAL, ISO and other standards setting best practices) to guide the methodology development process

B. engaging independent and international multi-stakeholder expert advisory groups to provide peer review feedback on draft materials (March 2016 to June 2016)

C. engaging ClimateCHECK as standards/assurance experts to assess the overall QA objectives/assertions of the ACT Pilot Project, and specifically to:

- Perform QA/QC on draft methodologies (e.g. rationale supporting methodologies is transparently documented and supported with credible references) to present during public consultation
- Help structure sector methodologies to have clear "shall and should" specifications
- Guide methodology developers specifying information to be reported in terms of verifiability (past) and validatability (future) activities and assertions
- Develop guidance for assurance providers to assess information reported by companies
- Perform QA/QC on the scoring methodology
- Assess the ACT Pilot Project overall in relation to the draft ISO 14080
- Support an accessible, transparent and interactive stakeholder consultation process, including supporting the company road-test reporting (July 2016 to January 2017)
- Provide a detailed QA report (over 500 pages) including recommendations to enhance QA/QC for ACT Phase 2

The scope of the QA included assurance on the following outputs and products of the ACT Pilot:

- ACT Framework Methodology
- Sector Specific Methodologies
- Scoring/Rating Methodology
- Development of verifier guidance to determine verifiability of requested and received documentation and information
- Development of reporting templates for ACT participant to ensure consistent reporting between the different participants.

6.3.5 MAIN FINDINGS OF THE QA PROCESS

An extensive QA process was established during the ACT Pilot and provided substantial learnings to inform planning for ACT Phase 2. This will enable it to incorporate more of the best practices for new methodology development, the rating process and reporting results during ACT Phase 2. Below are some selected findings from the QA process, for more detail please see the separate QA reports from ClimateCHECK.

A. The innovative ACT framework and methodologies integrate a complex array of best practices for company GHG management and reporting, auditing and rating. As stakeholders learn how ACT works, the QA process highlighted the value of very high levels of transparency in all aspects of ACT to engage stakeholders in the continued development of the ACT methodologies and use during ACT Phase 2 and into the future.

B. Following the ACT Pilot as assurance becomes a more important activity and more assurance providers are engaged, the verification/validation guidance should be further elaborated, specifically in relation to a) verified, b) verifiable (i.e. not already verified but conditions exist to enable verification), and c) validation of forward-oriented reported information.

C. Based on the learnings of the ACT Pilot Project, the ACT Framework would benefit with a redraft to ensure that it fully supports the expanding ACT program (principles, requirements, rationales for methodology development, QA/QC or validation, verification and assessment and periodical review) – Reviewing current and future version of the ISO 14080 standard might provide additional information for the redraft of the ACT framework.

6.3.6 REFLECTION ON THE QA PROCESS

ClimateCHECK observed the methodology development process and provided verbal feedback as required on ongoing basis to methodology developers at weekly project meetings, which allowed reflections and suggestions to be acted on rapidly to steer the process. There was also a formal gap analysis of the draft methodologies and the comments from contributors that had been made; the methodology developers were able to respond to this exercise with changes or additions to the methodology. Notably, these additions strengthened the rationale section which improves ease of use and enhances credibility of the methodology with stakeholders. Feedback was transferable between methodologies which improved their consistency. The Quality Assurance process findings also include recommendations for the next phase of the ACT project, allowing further improvements to both process and project outputs over time.

6.4 FINAL REFLECTION

ACT methodologies are anticipated to change, evolve and improve over time. The next phases of the ACT project will involve adapting the methodologies to be deployed in new ways; with SMEs, in developing countries, in markets where greenhouse gas accounting is less developed, and at larger scales. Changes to the methodologies will therefore need to be carefully managed to ensure that they continue to be effective and meet the ACT principles. The next phase of the ACT project will include work to develop a robust governance model for the future, and methods to manage changes to the methodologies will be included in the scope of this work.

A number of potential developments and improvements to the methodologies have been identified. These have come from the methodology developers themselves, from comments to the consultation and from the quality assurance process. These changes will be considered for inclusion in the methodologies alongside changes required to adapt the methodologies for new contexts. Considerations for implementing changes will include whether the change increases alignment with the ACT principles, what the impact on workload for reporting companies will be and whether the change increases the ability of the methodology to assess low-carbon transition.

7 The future of the ACT project

The project partners are seeking to build on the success of the ACT pilot project. Overall, the goal is build an ACT Ecosystem across the next few years, wherein several local initiatives can be guided through the ACT framework and tailored to the requirements of their specific environment.

To date, new partners have been brought on board, and 16 organisations signed the “ACT declaration” over the course of COP22 committing to further the broader aims of the project, which may include participating in the various pieces of work planned for ACT 2.0. The project will be initially structured to allow further development to proceed on a modular basis with country and sector based road testing, and capacity building work packages going ahead semi-autonomously in terms of both funding and organisation, to allow rapid deployment. ADEME, founding partner of ACT and original funder, has committed funding to an SME-focussed road test in French regions and discussions are ongoing with 2 other partners to develop road tests in two European regions. All these partners have committed budget and/or in kind support. This work will continue in parallel to the facilitation of the roll-out of additional sector methodologies and road-tests on a modular basis.

The ultimate goal is to enable ACT assessments at a truly global scale and embed the approach as next practice within the GHG management and measurement ecosystem. In order to successfully achieve this ambition, the governance structure, data infrastructure and business model of the project will be thoroughly researched, developed and market-tested over the next 12 – 36 months.

7.1 DETAILS OF CONFIRMED NEXT STEP PROJECTs

The ACT pilot companies were distributed globally but mainly located in the largest global economies. Achieving scale will also depend on bringing the project to smaller and developing economies, although such contexts will bring a different set of challenges for project implementation.

The next phase of the ACT project is actively seeking to address these challenges by running “road tests” of the methodology in different contexts.

France: This French road-test project will allow use and testing of the ACT methodology for 30 French small and medium enterprises (SME’s) and mid-cap companies. This project will cover the existing sectors (electric utilities, auto and retail) and investigate feasibility for two new sectors: agro-food and construction.

For these new sectors, the road-test aims to identify the relevant issues and indicators in order to initiate and facilitate the further development of the sectoral methodologies. The participating companies will receive support from selected consultants. The steps of this project are as follows:

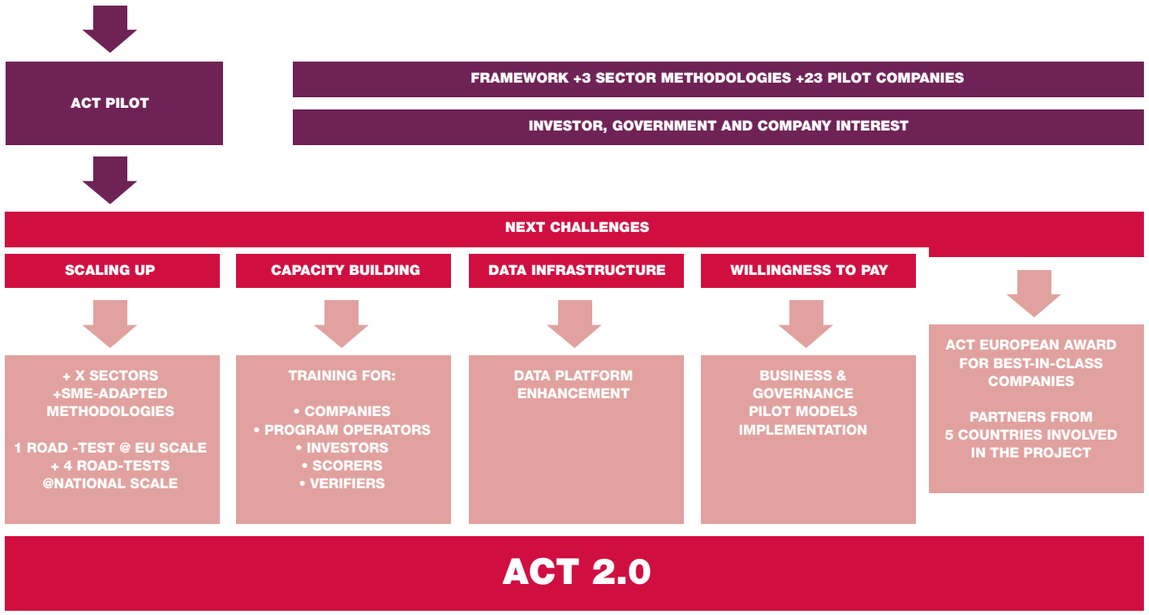
- Adaptation of the ACT methodologies (framework and sectoral methodologies) for SMEs and mid-cap companies from March to May 2017.
- Recruitment of SMEs and mid-cap companies from March to May 2017.
- Capacity building (trainings for companies and consultants), including training of assessors from March to June 2017.
- Testing of ACT methodology with companies (data collection, assessment, feedback) from July to November 2017.
- Final report and recommendations expected in December 2017.

The French roadtest will be led by ADEME in partnership with of Association Bilan Carbone (ABC), CDP, French Ministry of Environment, French SME federation (CPME) and other relevant stakeholders.

Central and Eastern Europe: SME and mid-cap companies will participate in a road-test of methodologies supported by a significant capacity-building infrastructure to build knowledge of GHG management techniques.

In addition to these confirmed initiatives, the project team is identifying other opportunities to scale up and implement the ACT methodologies and is keen to welcome new partners to the project.

FIGURE 40 **CHALLENGES FOR FUTURE OF ACT**



7.1.1 POTENTIAL USERS AND USE CASES

While all the outputs of ACT could be used in a variety of ways by those interested in company climate change, some examples of potential uses are set out here:

Program operators

Those operating programs to incentivize companies to reduce their GHG emissions, whether on a voluntary or regulatory basis, can implement ACT assessment methodologies to assess companies in target sectors and determine which are taking effective action to transition to the low carbon economy. Assessment results could be used to recognize leading companies, or recognition could be given for participation in an assessment program.

Investment analysts

Analysts could use the detailed results of company assessments when engaging with companies on their preparedness for transition to the low carbon economy, for example by developing benchmark levels for a company to achieve or following up on areas of strength or concern identified in the course of the assessment. Once widespread coverage of companies in a sector or investment universe has been achieved, ACT assessment results could inform asset allocation decisions, or be incorporated into investment analysis. Rating agencies could also use ACT methodologies to provide a climate performance element to their own decisions.

Companies

Data gathering for an ACT assessment and preparing to report against the ACT methodologies can give companies a framework for action to take to prepare for transition to the low carbon economy. It can also help prepare responses for investors engaging with companies on their preparedness for low carbon transition. Finally, public ACT ratings could be used by companies to benchmark themselves against their peers and communicate their progress to internal and external stakeholders.

7.2 AREAS FOR FUTURE DEVELOPMENT

ACT tapped into many scientific fields, using existing tools as well as developing and improving on existing tools to carry out the assessments. From these exercises, several concrete future development areas have been identified, whose completion would directly improve the quality of future ACT assessments.

7.2.1 IMPROVING RETAIL PRODUCT FILTER TOOL

A basic proof of concept of a tool to judge relative supply chain emissions from different retail product categories, based on spend data, was developed as part of the Retail sector methodology development. This was positively received by the pilot companies especially those who had not previously carried out product carbon hotspotting. The current version of the tool is limited in some respects: the mapping of industries to product categories is not very sophisticated; the tool is based on data from the US economy of 2004, and thus could be updated; and multipliers for land use change and air transport could be applied to certain categories to better reflect GHG impact. These improvements and development of a more useful interface could be reflected in an improved tool

7.2.2 COMPLETE HISTORICAL DATA SET FOR AUTO COMPANIES

The current Auto Manufacturing sector methodology does not consider the legacy emissions of vehicles sold in the past but currently on the road, and so does not reflect GHG efficiency improvements achieved in recent years by companies in the assessment. Development of a dataset of historic vehicle sales and associated emissions data would allow legacy vehicle emissions to be incorporated into assessments, and better reflect the contribution of vehicles already sold to company emissions budgets.

7.2.3 MORE ROBUST R&D METRICS AND DISCLOSURE FRAMEWORK

Collecting data on “green” R&D spend, and developing effective metrics to benchmark it was a challenge for the ACT assessments. Firstly, R&D spend is usually considered commercially sensitive and companies are reluctant to publicise it. Second, definitions of “green” spend are rarely clear-cut, and R&D developments will usually have multiple motivations beyond simply reducing emissions. For example, lightweighting and improving materials in the Auto Manufacturing sector may improve vehicle carbon efficiency but may be primarily motivated by the desire to improve performance. Finally, interest in R&D spend by climate-focussed analysts is a relatively new phenomenon and reporting channels to gather and communicate this information within companies are not fully developed.

7.2.4 INCORPORATING A LIFE CYCLE APPROACH TO EMISSIONS MEASUREMENT

Current emissions factors used in the assessment models focus on the direct emissions from the activity selected as the most significant emissions source for the sector, for example electricity generation for electric utilities and vehicle emissions for auto manufacturers. However, this choice means that emissions associated with other life cycle phases, for example the production, processing and transport of fuels, production and maintenance of assets, or end of life emissions, are not included. These emissions sources are complex to calculate and there is wide divergence in methodological approaches, assumptions and end results of these calculations. This is why this approach was discounted for the ACT pilot where time was constrained. In the future, if these methodological issues can be overcome, incorporating life cycle emissions values into assessment models could give a more accurate picture of company emissions.

7.2.5 ENHANCING THE "DATA QUALITY NARRATIVE" SECTION OF THE ASSESSMENT

For the pilot phase, a simple data quality narrative was provided in feedback reports outlining the main data sources used and highlighting any significant concerns about data quality. This could be made more comprehensive in future, potentially incorporating metrics for easier comparison of data quality. As data users from the spheres of investment or government begin to make use of the data reported against the ACT methodology the requirement for information on the quality of data used for the assessment will be greater.

As part of the ACT methodology development guidance for potential future verifiers of the data for ACT assessments was developed. As the project develops further and use of data and assessments increases, demand for good quality data will grow. Third party assurance and/or verification over the data gathered will increase confidence in data quality but needs to be tailored to the needs of the initiative and data users. Additional guidance on good practice for verifiers at the process level may be required. Continued exploration of how verification and assurance processes can support the ACT initiative will be needed in future.

7.3 ADDRESSING IDENTIFIED WEAKNESSES IN THE ACT PILOT PROJECT

Chapter 6 identified a number of distinct weaknesses of the current ACT pilot implementation. In order to successfully implement larger scale ACT assessment projects, the developers provide some suggestions based on our experience on how to potentially overcome these hurdles.

7.3.1 DETAILED ANALYSIS IS HARD TO SCALE

The level of analysis provided to companies in an ACT assessment must be balanced against several considerations; the willingness of a potential user of such analysis (company, investor or other) to pay for it, and the value placed on it; its effectiveness in giving the company the tools it needs to improve its transition to the low-carbon economy. As the methodologies are standardised and tools associated with it develop, there may be potential to use technology to further automate elements of the analysis or indeed factor in pre-existing analysis from third parties where it complements or overlaps with the ACT assessment. The frequency with which analysis is completed will also determine the amount of work to be done over time: If a company is proceeding in a stable manner along a transition plan assessed as good, and there are no material changes to its business, then there may be no need for an intensive assessment process. Some of the challenges in analysis encountered in the pilot also flowed from challenges in data collection and questions around the quality or integrity of data. Embedding of the methodological approach over time and building capacity within companies could reduce these data issues and ease the analysis process. Other solutions to data quality problems include the use of third-party verification and potential new technological approaches such as blockchain to ensure a cryptographic "chain of custody" over data from source to user, and XBRL to allow more flexible structuring and manipulation of data [10] [11].

Act asked for many types of data that have not been traditionally collated by sustainability departments, including data on generation or vehicle fleet, green R&D expenditure, and transition planning. Investors are now becoming more sophisticated in their analysis of company climate change performance and it is likely that such data will be requested by other stakeholders, and not just the ACT methodologies, in the future. As this demand grows a standardised approach is more likely to develop, and systems and tools to both collect and make such data public will emerge. More readily available data will facilitate analysis for assessments by ACT and others. The challenge for ACT developers is to enable; this standardisation process; the demand for more relevant and detailed data; and the systems that will allow a practical implementation of data sharing and gathering.

7.3.2 LIMITATIONS OF A VOLUNTARY PROGRAM

ACT pilot companies volunteered for the project. For many, a driver for participation was the fact that they had already started to consider the challenge of low-carbon transition internally and wanted to validate and share their own thinking and approaches. However, this in itself does not provide a particularly strong business case for participation, and levels of motivation and resource applied to the project varied between companies. This was reflected in the fact that not all companies had the resource to prepare a response, data gathering took longer than expected and data quality was not optimal. Companies that did participate in reporting and receive an assessment derived value from it, reporting for example that;

- They were better prepared to respond to investor questions on low-carbon transition.
- They had been able to validate their own internal strategy.
- They used the assessment results for internal communication.
- They received useful feedback on areas for improvement.
- They had identified potential "next practice" actions which they could implement to maintain a climate leadership position.

Whether offered as a commercial proposition or not, future iterations of ACT need to communicate the value to be gained from participation to ensure engagement with the process and adequate resourcing by participants. In addition, new incentive structures could be added, for example award, labels or badges for those participating or receiving a certain result. Ultimately, embedding use of ACT in the investment community over the long term and creating an expectation that companies will be robustly assessed for their alignment with low-carbon transition will provide the best incentive.

7.3.3 NO LINK TO FINANCIAL FEASIBILITY

Currently the ACT methodologies offer room for assessors to include very significant financial risks to low-carbon transition in the assessment narrative component of the ACT rating, where necessary. However, the current rating largely excludes financial metrics such as the financial viability of a company's low-carbon transition plan, meaning that it could be used alongside a separate judgement of this which an individual analyst or investor chose to develop. In future, financial metrics could be integrated into the rating. An interesting area for development is the linking of current emissions models for assessment to financial models, or incorporating financial metrics in the current models. Alternatively, new financial indicators and benchmarks could be added to assessment modules or considered in the assessment narrative.

Appendices

LEADING PRACTICE

ENEL

Of the companies included in our pilot study, Enel is the one of two companies that has committed to emissions reductions that are verified by the Science Based Targets initiative. These corporate targets are only approved if they meet a strict criterion that scientists agree are in line with the transition with the low-carbon economy. Despite the majority of the world's largest 500 companies reporting to CDP disclosing that they had set emission reduction goals, very few reach the scale required to properly address the threat of climate change.

One such commitment is the long-term decarbonisation of its energy mix by 2050, with intermediate targets being set to achieve this. By 2020, Enel has committed to reduce CO2 emissions by 25% per kWh, from a 2007 base year, which includes the decommissioning of 13 GW of thermal plants in Italy. These targets are consistent with the level of decarbonisation required to limit climate change to the 2-degree benchmark. Enel's science-based targets transition to a more efficient and renewably powered low-carbon economy, and are also compatible with long-term economic growth, by driving innovation, reducing costs and thus enhancing profitability.

Enel's targets are outlined in their 2017-2019 strategic plan. These cement their commitment to achieve decarbonisation of the mix by 2050, and set an increase in their renewable capacity of >8 GW. This plan outlines their business model development that challenges a 'business-as-usual' approach. Enel plans to greatly expand their renewables business line and the increase in the capacity in the period is expected to allow the company's generation mix to reach close to 60% from emission-free sources by 2019. Significant investments are also planned for grid digitalization as lever to drive further expansion of electricity generation based on renewables. Enel is consequently leading the transition to a low-carbon economy within the energy industry, whilst gaining a competitive advantage in the process.

LEADING PRACTICE

Toyota

In the ACT assessment, Toyota had one of the most comprehensive low-carbon transition plans in the ACT project pilot study. The two existing plans outline both short-term targets via their Sixth Environmental Action plan and long-term targets via the Toyota Environmental Challenge 2050, which are both publicly available online. To manage the success of these plans, both action plans have specific quantitative targets, which are ambitious but have realistic timescales set.

A key part of Toyota's transition plan is their low-carbon vehicle pathway, which is vital to the transition planning of any auto company. One such target is the widespread adoption of HVs, by expanding the line-up and achieving further high-performance development towards the goal of annual sales of 1.5M units and cumulative sales of 15M units of hybrid vehicles by 2020. Additionally, Toyota's low-carbon transition plan extends to all tiers of their supply chain – from the production processes including water consumption targets and the reduction of VOC emissions; logistical efficiency targets; and the promotion of low-carbon vehicles for the downstream value chain. Of fundamental importance in their low-carbon transition plan are schemes to work closely with suppliers, such as their Toyota Green Purchasing Guidelines.

Toyota has positioned the environment as a key management issue and has formed activities around this through a promotional structure for global environment management. This has enabled the company to effectively incorporate climate change targets into their business model. Furthermore, the consideration of potential 'shocks' or stressors of their low-carbon transition has been included into their business plans, by assessing the risks and opportunities related to climate change and water issues in the supply chain.

LEADING PRACTICE

Decathlon

Decathlon has notably strong action underway for reducing emissions. Decathlon's strategies incorporate reductions of direct emissions, and in particular indirect emissions reductions into its business model, thus improving sold product performance. Notably, the company places emphasis on using recycled material in the production of some own-brand products, as well as optimising energy use in production through the choice of production methods.

Decathlon has a strong consumer focus integrated into its business plan, which enables customers to make low-carbon choices. Of particular note are initiatives such as repair services to extend the life-cycle of products; eco-design; and the "Trocathlon" initiative – a bi-annual event and online exchange service whereby consumers are able to sell second-hand sports equipment free of charge. Decathlon uses an extensive carbon hotspotting method, which is repeated and updated as more products are added each year. Hotspotting informs their eco-design, and is used to shift consumers' purchasing patterns.

Decathlon has recognised that the majority of its emissions come from its products, which it has recently quantified by taking part in the Product Environmental Footprint (PEF) pilot study. Using the results from this, and its association with the PEF initiative, Decathlon has ascertained that 74% of its emissions come from the upstream value chain. One of Decathlon's strongest upstream interventions involves targeting dyeing of products, working with a subcontractor to develop a new dry dyeing process that uses considerably less energy and water.

LEADING PRACTICE

SSE

SSE has demonstrated excellence by significantly reducing emissions over the past few years, attaining a maximum score in ACT for its trend in past emissions intensity. The company's core carbon target proposes a 50% reduction in the carbon intensity of the electricity it generates by 2020, based on 2006 levels. SSE is on track to meet this target, and is currently ahead of schedule having significantly reduced intensity to 397 gCO2/kWh in 2015/16 from nearly 600 a few years earlier.

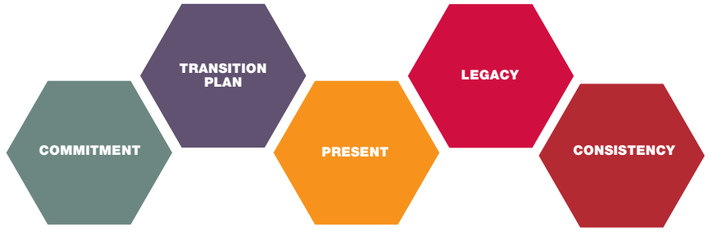
This performance is a result of its well-established energy strategy which includes continued investment in renewable generation. Over the past decade, SSE has made large investments, most notably in wind energy, and the company has spoken openly about its intent to move away from coal towards a generation portfolio focussed on renewables and gas. SSE currently has the largest renewable energy capacity in the UK at 3,275MW, and invested over £291m in renewable energy in 2015/16. The company's recent investment patterns, and the considerable size of renewable energy in the current portfolio, show strong credibility towards successfully implementing a strategy based on low-carbon energy sources.

LEADING PRACTICE

Renault

Of all the pilot companies, Renault shows great consistency throughout its climate performance. Renault has set science-based targets to reduce its scope 1, 2 and 3 emissions, resulting in a perfect score for its target ambition and target horizons. These strong science-based targets extend to 2022 and encompass a 2050 vision. Renault's 2022 target aims for a 31% intensity reduction in emissions across scope 1, 2 and 3 emissions categories in tCO2 per vehicle produced (base year 2010). This has been developed with a proposed 2050 vision that aims for an 88% intensity reduction (base year 2000). Additionally, Renault's significant historic target ambition and company performance has ensured that no horizon gap exists for their scope 3 target setting.

In terms of low-carbon vehicle sales, Renault is a market leader and has experienced rapidly increased low-carbon vehicle sales in the past few years. This has amounted to beyond its market share weighted benchmark – that is, a measure of a company's growth in sales of low-carbon vehicles as compared with annual growth rate required in the sector under a 2-degree scenario. This puts Renault as having no low-carbon vehicle sales gap, being far above the required benchmark. Of their low-carbon vehicle sales, Renault has cemented itself as the leader in electric vehicle sales in Europe, having sold far more electric vehicles than would be expected of the company as per global market share.



ACKNOWLEDGEMENTS

The ACT project has been a collaborative effort and the project team wishes to thank all of those who gave their knowledge and time to the project:

All of the pilot companies

Members of the advisory group

All those who provided comments to the public consultation

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