

ACT

ROADTEST REPORT

Assessing low- Carbon Transition

Glass



June 2022

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Background and purpose of this document

This document is part of the Assessing low-Carbon Transition (ACT) initiative and provides the main details of the ACT Glass road test. As part of the development of a new ACT sector methodology, this road test is conducted to improve the existing methodology and adjust the tools and inputs used to assess companies in this sector.

The current report is intended for the Board (ADEME and CDP) and the members of the technical working groups (TWGs).

This report aims to provide the key findings of the assessment and an overview of results for the sector. Additional materials prepared during the assessment process, including detailed company data and feedback, informed the results summarised in this report but remain confidential.

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1. ACT Glass Road Test

1.1. CONTEXT OF THE ROAD TEST

GLASS SECTOR

The glass sector is one of the major contributors to climate change, and is often included in greenhouse gas (GHG) emissions figures for industry and buildings). Glass production requires high temperatures and therefore energy, and the process also emits some GHGs as process emissions. In the glass manufacturing industry, heat is used to fuse the carbonates and other raw materials into the specified glass type. Some glass melting furnaces are heated using electricity. For non-electric glass melting furnaces, coal, natural gas, distillate fuel oil, and residual fuel oil are all possible fuel inputs, although most, if not all, are fired with natural gas. The actual mix of fuels is site-specific and depends on the geographical zone and the availability of supply. Major carbonates used in the production of glass are limestone, dolomite, and soda ash. The production of these raw materials is highly emissive, and the resulting scope 3 upstream of glass companies often represents around 40% of total CO_{2e} emissions. Transport occurs at different stages in the glass manufacturing process: the transport of raw materials or secondary materials to the plant, and the transport of finished products from the plant to the market. The GHG emissions related to transport of raw materials represents between 1% and 2% of the product's total emissions. Consequently, companies in the glass sector face major climate-related transition challenges all along their value chain.

The sector has made some progress in tackling its climate impact by incorporating sustainability strategies into its business. Given the growing pressure on highly emissive sectors, glass companies are being increasingly challenged to transform and adapt their business models towards a low-carbon economy. Therefore, companies and investors in the sector are aiming to understand whether the sustainability strategies adopted are sufficiently ambitious to align with a low-carbon transition scenario.

The ACT initiative assesses and evaluates companies' sustainability strategies to determine whether their proposed plans and actions align with a below-2°C scenario. In the context of this road test, 14 companies were analysed and scored according to the most recent version of the ACT Glass Methodology (version 0.6, dated July 2021). The results of the road test are detailed in this report and in the accompanying Technical Working Group Meeting slide deck presented on 27.04.2021, which lists detailed feedback from the companies by module and indicator.

This report concludes that the companies in this sector must align their decarbonisation efforts with their ambitions, and in particular increase the pace and intensity of the renovation of furnaces, and increase the recycled content in their production mix, while extending the scope of their climate actions to include scope 3 emissions (upstream and downstream). Current activities and expected future performance are not aligned with a below-2°C transition pathway, exposing companies in this sector to climate and market risks.

CONTRIBUTING TO ACT: NEW SECTOR DEVELOPMENT

For the past seven years, ADEME and CDP have been working together on developing the 'Assessing low-Carbon Transition' (ACT) initiative, a mechanism for assessing companies that have set climate commitments and want to take climate action in line with the Paris Agreement. The ACT methodologies use a holistic approach to assess a company's climate strategy and determine its readiness to transition to a low-carbon

economy. The ultimate goal is to drive action by companies and encourage them to set their business on a below 2°C-compatible pathway.

The ACT methodologies use the Science-Based Targets initiative's (SBTi) Sectoral Decarbonization Approach (SDA), which compares public commitments with a low-carbon transition scenario. ACT's ambition is to prioritise the most emissions-intensive sectors. This approach means that tools and methodologies have to be adapted for each new sectoral development process in order to accurately reflect their impact on climate change. So far, the methodologies for the Auto, Electric Utilities, Retail, Construction, Real Estate and Property Developer, Cement, Transport, Oil & Gas and Iron & Steel sectors have been released. The Agriculture & Agrifood sector methodology is in the final stage of refinement before publication. As of June 2022, road tests for the Chemicals, Pulp & Paper, Aluminium and Glass Methodologies are all in their final stages, with these sector methodologies due to be published in summer 2022. The stages of methodology development are as follows:

- Stage 1: Methodology development (including a one month-public consultation);
- Stage 2: Methodology experimentation (road test);
- Stage 3: Methodology refinements & release.

ASSESSED COMPANIES

The ACT Glass Methodology is designed to assess a company's climate impacts across its value chain. In practice, not all companies have activities in all stages of the value chain. As a result, the methodology used for the road test categorises companies into three types, according to the type of activities they engage in (see Figure 1):

1. **Integrated:** Companies which are active in both glassmaking and glass shaping activities;
2. **Raw material (batch house) and glass melters:** Companies which are active only in the upstream part of the value chain;
3. **Glass shapers:** Companies which are active only in the downstream part of the value chain.

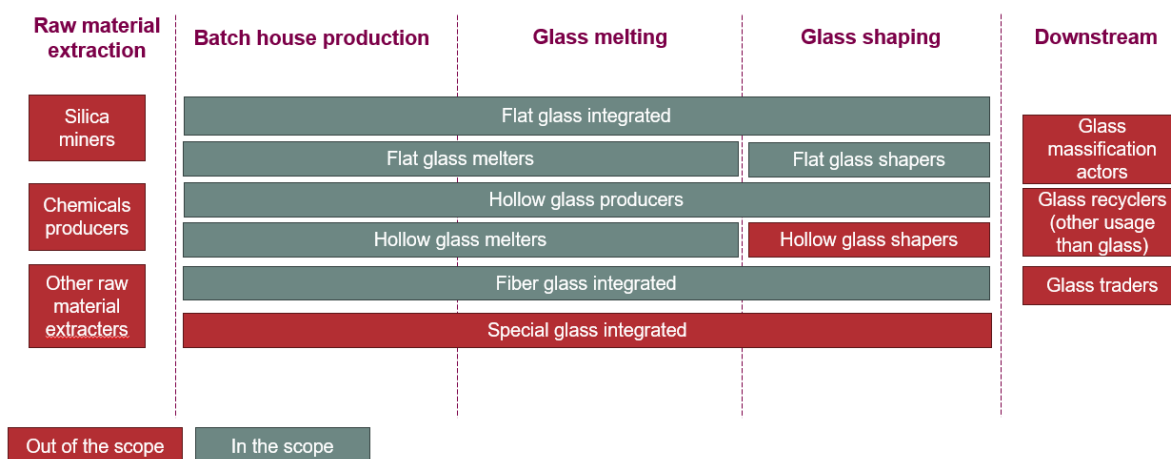


FIGURE 1: ACTORS THAT CAN BE ASSESSED WITH THE ACT GLASS METHODOLOGY

Conversely, certain activities and subsectors are excluded from the ACT Glass Methodology due to their limited levers and scope of action. These include:

- Silica miners;
- Chemicals producers;
- Other raw materials extractors;
- Hollow glass shapers;
- Special glass integrated;

- Glass modification actors;
- Glass recyclers;
- Glass traders.

The companies are also disaggregated depending on the type of glass they produce. This classification influences the overall ACT performance results through score weightings, which adapt raw scores according to the relevance of each indicator to a company's activities. Three types of glass are considered:

1. Flat glass;
2. Hollow glass;
3. Fibreglass.

The ACT methodology relies on the principle of relevance, and therefore only the companies that have both significant climate impact and significant mitigation levers can be assessed with ACT's approach. For this road test, nine glass makers agreed to participate in the data collection and co-construction of the analysis. These companies were as follows:

- Flat glass: AGC, NSG, Saint-Gobain (also in Fibreglass);
- Hollow glass: O-I, Pochet, Pyrex, Verallia, Verescence;
- Fibreglass: Knauf Insulation, Saint-Gobain (also in Flat glass).

Furthermore, five more companies were assessed during the road test based on publicly available data.

GOALS OF THE ROAD TEST

The project's objectives were:

- to test the ACT Glass draft methodology and accompanying tools;
- to provide recommendations to refine the methodology in order to ensure that ACT Glass is relevant and robust for the sector;
- to engage companies and other stakeholders in the low-carbon transition.

The road test for the ACT Glass Methodology has been carried out, on behalf of ACT, by a consortium of consulting companies, made up of I Care, Solinnen and Novasirhe.

ASSESSMENT PROCESS

I Care, Solinnen and Novasirhe planned and conducted the assessment, which involved direct engagement with companies and leading monthly meetings with the ACT Glass steering committee. Engagement with companies followed the steps described in Figure 2.

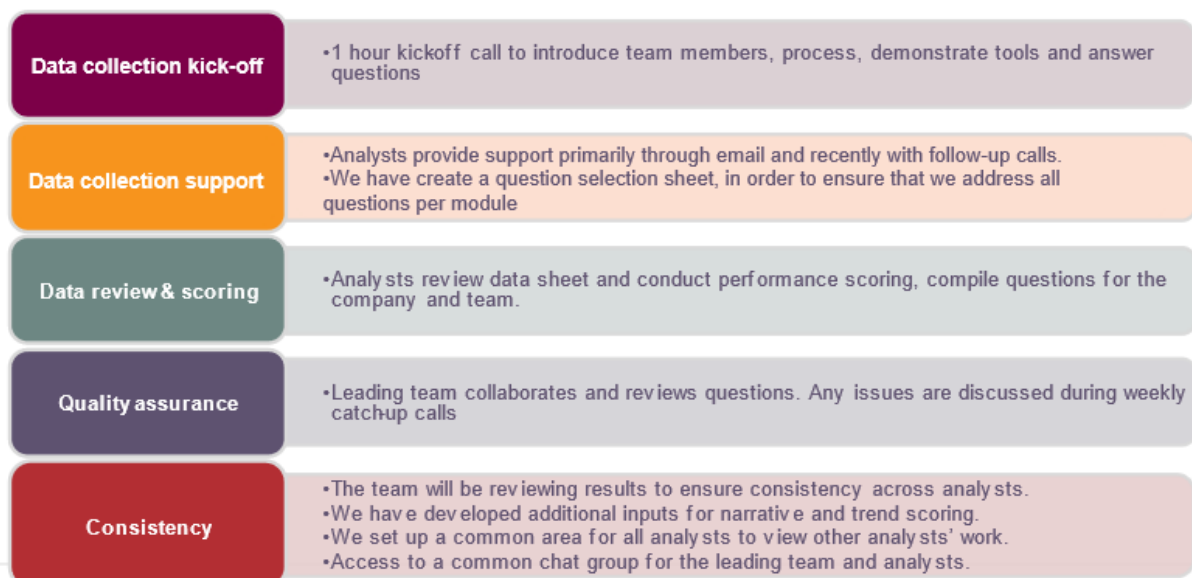


FIGURE 2: GLASS ASSESSMENT APPROACH

The main inputs for undertaking the assessments were provided to the consortium of consulting companies by way of four complementary files/tools:

- **The ACT Glass Methodology, version 0.6.** This document contains the scoring criteria for each of the indicators and lists how the scores are calculated and weighted. The methodology also provides relevant context for each of the indicators and an overview of the main goals of each module.
- **The Excel data collection tool.** Companies were asked to directly fill out their response to the ACT indicators in the Excel data collection tool with the assistance of the analyst. This version of the data collection tool also includes a guidance and calculation sheet for road-testing elements of the draft ACT Adaptation Methodology as a complementary aspect of the ACT Glass assessment.
- **The online ACT tool.** Once the Excel data collection tool is completed, analysts review the responses and enter the data in the online ACT tool, which automatically calculates a weighted score based on the company's answers and their reported classification (flat glass, hollow glass and fibreglass). This online ACT tool is updated with the evolution of the methodology and allows the analyst to automatically calculate all the scores in a simplified way, as well as giving useful graphs for the feedback report. This tool also incorporates the narrative scoring tool (narrative scoring maturity matrix) and allows the analyst to have a simpler overview of the analysis.
- **The trend scoring tool.** This tool includes additional guidance for analysts in order to evaluate the trend score. It is only a support for the analyst who still has the final word for a more in-depth evaluation of the company's trend.

The process was kicked off by an initial call between the companies and the consortium. During the one-hour call, the companies' teams were given a brief explanation of the ACT initiative, the expected timeframes and deadlines, a general description of the relevant inputs, and an overview of the Excel data collection tool. Companies were subsequently sent the Excel data collection tool and the methodology documents, and were encouraged to send questions via e-mail or through follow up calls. Company questions were collected in a spreadsheet accessible to all analysts to ensure shared learnings, and consistency in the responses.

Once companies submitted the completed Excel data collection tool with their inputs, analysts reviewed the responses and began the scoring process. Analysts listed their scoring questions and additional questions sent by companies in a 'post-review' company-specific spreadsheet. These questions were often more specific, referring to the company's business model and/or to the interpretation of the scoring criteria given

the assessed response. These spreadsheets were reviewed by the consortium 'lead' team, and ultimately provided a valuable source of company feedback as captured in the accompanying TWG meeting PowerPoint slide pack.

After the analysts finalised a company assessment, the lead team would review the Excel responses and ensure scores were consistent and gave an accurate reflection of the company response. If any issues were identified, the response was sent back to the analyst for review and, if necessary, adjustments to the scores were captured.

1.2. THE ACT GLASS METHODOLOGY

GENERAL APPROACH

While each ACT methodology is sector-specific, they are all based on the ACT Framework and as such there are fundamental commonalities among all of them. The assessment's main goal is to evaluate past, present and (anticipated) future company performance to determine the company's maturity level with respect to its transition to a low-carbon economy. The ACT initiative focuses on five guiding questions to determine company performance:

1. **Commitment:** What is the company planning to do?
2. **Transition plan:** How is the company planning to get there?
3. **Present:** What is the company doing at present?
4. **Legacy:** What has the company done in the recent past?
5. **Consistency:** How do all these plans and actions fit together?

These guiding questions are assessed through a series of modules composed of key performance indicators and sub-indicators, many of which are specifically designed for each sector. For the glass sector, there are a total of 28 indicators organised into nine modules. Figure 3 shows an indicator-level map illustrating how these indicators assess company performance at different points in time.

		GLASS SECTOR			
		Past	Present	Future	
Core business performance	Investment	1. TARGETS	GL 1.3 Achievement of previous targets		GL 1.1 Alignment of relevant scope emissions reduction targets GL 1.2 Time horizon of targets
		2. MATERIAL INVESTMENT	GL 2.1 Past performance	GL 2.4 Alternative fuels and energy mix decarbonisation GL 2.5 Recycled content integration strategy	GL 2.2 Locked-in emissions GL 2.3 Trend in future emissions intensity
		3. INTANGIBLE INVESTMENT		GL 3.1 R&D in climate change mitigation technologies GL 3.2 Company low-carbon patenting activity	
		4 SOLD PRODUCT PERFORMANCE	GL 4.1 Past performance including purchased glass production assets	GL 4.2 Purchased product interventions	
		5. MANAGEMENT		GL 5.1 Oversight of climate change issues GL 5.2 Climate change oversight capability GL 5.4 Climate change management incentives	GL 5.3 Low-carbon transition plan GL 5.5 Climate change scenario testing
Influence		6. SUPPLIER	GL 6.2 Activities to influence suppliers to reduce their GHG emissions	GL 6.1 Strategy to influence suppliers to reduce their GHG emissions	
		7. CLIENT	GL 7.2 Activities to influence customer behaviour to reduce their GHG emissions	GL 7.1 Strategy to influence customer behaviour to reduce their GHG emissions	
		8. POLICY ENGAGEMENT		GL 8.1 Company policy on engagement with trade associations GL 8.2 Trade associations supported do not have climate-negative activities or positions GL 8.3 Position on significant climate policies	
		9. BUSINESS MODEL	GL 9.1 Low-carbon business activities that aim at increasing energy efficiency and the use of low carbon energy or optimizing the process GL 9.2 Low-carbon business activities that aim at developing synergies with other industries (only for flat glass and fiber glass) GL 9.3 Low-carbon business activities that aim at developing the circular economy GL 9.4 Low-carbon business activities that aim at reducing the structural barriers to market penetration of low-carbon products without degrading the performance of the product		

FIGURE 3: GLASS METHODOLOGY MODULES, INDICATORS AND TIME HORIZON ASSESSED

The assessment is carried out based on the information provided for each of these indicators by the company. The Glass Methodology uses a combination of quantitative and qualitative indicators. Purely quantitative indicators are scored according to a formula and based on the data provided by the company. In these cases, analysts must ensure the calculation is correct and the information provided by the company is consistent and, to the extent possible, verifiable.¹ Qualitative indicators are evaluated by the analyst using the company responses and indicator-level maturity matrices with up to five scoring levels: Basic (0 points), Standard (0.25 points), Advanced (0.5 points), Next practice (0.75 points), and Low-carbon aligned (1 point). Maturity matrices provide scoring criteria per indicator for each of these levels.

ACT GLASS METHODOLOGY ASSESSMENT

Like all ACT assessments, the Glass Methodology generates a three-part score that allows companies to understand how they scored based on the key performance indicators, how their overall strategy is rated with reference to a low-carbon (below-2°C) transition scenario, and if their strategy is effective in aligning with a low-carbon pathway. The final score is presented as the performance score (0 to 20) followed by the narrative score (E to A) and the trend score (-, = or +). For the glass road test, some adjustments were implemented, as described below:

1. **The performance score** ranges from 0 to 20 and is the result of the sum of all points achieved and weighted according to the company's classification (glass type, integrated or not). In order to refine the indicator weightings, as stated in the methodology, all companies were asked their share of upstream scope 3 emissions among their total emissions, and the hollow glass companies were asked the share of container glass among the total glass production.
2. **The narrative score** is the result of the analyst's evaluation of the overall response, complemented by an external data review for the company in question, and graded from E (lowest score) to A (highest score). The narrative score is assessed using a maturity matrix developed by the ACT initiative and composed of four criteria (Business model and strategy; Consistency and credibility; Reputation; and Risk). In cases where companies failed to give sufficient proof for the data they provided (documents, reports, etc.) while still being credible enough according to the analyst, the narrative score was artificially decreased through the Risk criterion.
3. **The trend score** evaluates whether a company is increasingly aligning with a low-carbon transition pathway or distancing itself from a low-carbon transition pathway. The trend score is indicated by a + sign (best score, reflecting increasing alignment), a – sign (worst score, reflecting reducing alignment), and an = sign (indicating no projected change in its alignment). The guidance provided in the ACT Framework was drawn on by ADEME to build a simple Excel tool to serve as guidance for analysts. The inputs for this tool were taken directly from the Glass Methodology using a simple grading scale from -1 to 1 that analysts assigned based on the results of the following forward-looking indicators:
 - GL 1.1 Alignment of relevant scope emissions reduction targets;
 - GL 1.2 Time horizon of targets;
 - GL 2.2 Locked-in emissions;
 - GL 2.3 Trend in future emissions intensity;
 - GL2.4 Alternative fuels and energy mix decarbonisation;
 - GL 3.1 R&D in climate change mitigation technologies;

¹ Given the granularity of quantitative data required and the confidentiality of this information, it wasn't always possible to verify the data provided

- GL 4.2 Purchased product interventions;
- GL 5.3 Low carbon transition plan;
- GL 5.5 Climate change scenario testing;
- GL 6.1 Strategy to influence suppliers to reduce their GHG emissions;
- GL 7.1 Strategy to influence customer behaviour to reduce their GHG emissions;
- GL 9.1 Low-carbon business activities that aim at increasing energy efficiency and the use of low carbon energy or optimizing the process;
- GL 9.2 Low-carbon business activities that aim at developing synergies with other industries (only for flat glass and fibreglass);
- GL 9.3 Low-carbon business activities that aim at developing the circular economy;
- GL 9.4 Low-carbon business activities that aim at reducing the structural barriers to market penetration of low-carbon products without degrading the performance of the product.

The results shown by the tool implied positive scores (>0) were more likely to be trending in a low carbon-aligned pathway, while negative scores (<0) were more likely to be diverging from a low-carbon aligned pathway.

To complete the assessment, the road test requires several files to be created and shared with the relevant parties indicated below.

These files include:

1. **The online ACT tool with the company's response and analyst score.** This file includes the scores per module and indicator, as well as explanations on the rationale of the scoring. These remain confidential within the ACT team (including each analyst's consulting firm).
2. The **data collection tool**, as a transcript of the ACT tool, that can be shared with the reporting company.
3. An **ACT company feedback report** (PowerPoint) summarising the results and providing a brief overview of the challenges and opportunities the company may be facing. This presentation is shared by the ACT team only with the company concerned and is based on a template generated by ACT.

FOCUS ON THE ACT GLASS SCORE

The glass questionnaire is structured according to nine modules presented in the table below:

TABLE 1: LIST OF MODULES IN THE ACT GLASS ASSESSMENT

Modules
1. Targets
2. Material investments
3. Intangible investments
4. Sold product performance
5. Management
6. Supplier engagement
7. Client engagement

8. Policy engagement
9. Business model

The ACT indicators are based on comparison against a benchmark:

- For quantitative indicators in Modules 1, 2 and 4, a company benchmark, derived from a sectoral benchmark, is used for defining a reference pathway for the company in terms of carbon emission intensity;
- For qualitative indicators in Modules 3, 5, 6, 7, 8 the levels have been built to reach the decarbonisation expected for 2050.

In the benchmark, the emissions intensity metric should be aligned with the emissions intensity of the benchmark chosen. Regarding the proxy used, it would be tonnes of glass.

In the glass industry statistics, two types of data can be used. One is melted glass, which is the actual output coming directly from the glass furnace. The other is packed glass, which is always a lower amount than melted glass due to losses in the processing. Any process losses can normally be recycled as internal cullet in the flat and hollow glass subsectors. In order to keep the approach coherent with the EU ETS regulation already used by the glass sector in Europe, the following approach was used:

- Concerning hollow glass and fibreglass products (integrated along the value chain), for the integrated or glass-melting actors, tonnes of packed glass is the emissions intensity metric. If a type of product is not covered by the EU ETS (because EU ETS does not cover all products), the emissions intensity metric used could be the one currently used in the GHG emissions reporting of the company;
 - An exception is made for flaconnage and tableware/cookware: tonnes of pulled glass is the relevant emissions intensity metric;
- Concerning flat glass products (integrated along the value chain or glass melters only), for the integrated or glass-melting actors, tonnes of melted glass is the emissions intensity metric;
- For glass shapers, there is no specification, so tonnes of glass is the emissions intensity metric.

The emissions intensity metrics will be improved based on the feedback from the road test.

Contrary to previous road tests, all quantitative aspects were automatically calculated in the online ACT tool on the basis of the input data reported by the analyst.

Another element specific to the ACT Glass Methodology and scoring is the weightings used to adjust the scores according to company activities along the glass value chain. Modules are weighted depending on where the emissions of the assessed company are the most significant. In this sense, modules 2 and 4, as well as modules 6 and 7 for hollow glass companies, were weighted dynamically:

Modules 2 and 4

- Module 2 (Material investment) is focused on the actions of the company to reduce its scope 1+2 emissions.
- Module 4 (Sold product performance) is focused on the actions of the company to reduce its scope 3 upstream emissions (externalized glass melting emissions)

This dynamic calculation has been developed to consider the variable CO₂ emissions of the company's products.

The calculation method is described below:

The Share_{Scope3upstream} is defined at corporate level for the reporting year as:

$$\text{Share}_{\text{Scope3 upstream}} = \frac{\sum(\text{Scope 3 upstream emissions})}{\sum(\text{inclusive scope 1+2 emissions}) + \sum(\text{Scope 3 upstream emissions})}$$

The weightings for Module 2 and Module 4 are calculated according to the formula:

$$\text{Weight}_{M2} = 28\% - 20\% \times \text{Share}_{\text{Scope3 upstream}}$$

$$\text{Weight}_{M4} = 8\% + 20\% \times \text{Share}_{\text{Scope3 upstream}}$$

Modules 6 and 7, for hollow glass companies

- Module 6 (Supplier engagement) is focused on the actions of the company regarding their supplier (raw materials, energy, transport of raw materials).
- Module 7 (Client engagement) is focused on the actions of the company regarding their clients (reuse of the final product, transport of the final product, recycling at the end of life).

This dynamic calculation has been developed to consider the different levers linked to the type of products.

The calculation method is described below:

The $\text{Share}_{\text{Containers}}$ is defined at corporate level for the reporting year as:

$$\text{Share}_{\text{Containers}} = \frac{\textit{Tonnage of containers produced}}{\textit{Tonnage of all glass products}}$$

The weightings for Module 6 and Module 7 are calculated according to the formula:

$$\text{Weight}_{M6} = 8\% - 4\% \times \text{Share}_{\text{Containers}}$$

$$\text{Weight}_{M7} = 4\% + 4\% \times \text{Share}_{\text{Containers}}$$

TABLE 2 : PERFORMANCE INDICATOR WEIGHTINGS

GL	Modules	Indicators	INTEGRATED AND GLASS MAKING ONLY	PRODUCT SHAPING ONLY
1.1	1.Targets	Alignment of relevant scope emissions reduction targets	10%	10%
1.2		Time horizon of targets	3%	3%
1.3		Achievement of previous targets	2%	2%
2.1	2.Material Investment (Scope 1+2)	Past performance	Weight _{M2} x 10%	
2.2		Locked-in emissions	Weight _{M2} x 35% Only for borosilicate glass : Weight _{M2} x 40%*	
2.3		Trend in future emissions intensity	Weight _{M2} x 15% Only for borosilicate glass : Weight _{M2} x 20%*	3%
2.4		Alternative fuels and energy mix decarbonisation	Weight _{M2} x 20% Only for borosilicate glass : Weight _{M2} x 25%*	5%
2.5		Recycled content integration strategy	Weight _{M2} x 20% Only for borosilicate glass : Weight _{M2} x 5%*	
3.1	3.Intangible Investment	R&D in climate change mitigation technologies	6%	3%
3.2		Company low carbon patenting activity	3%	1%
4.1	4. Sold product performance (Scope 1+2+3 upstream)	Past performance including purchased glass production assets		6%
4.2		Purchased product interventions	Weight _{M4} (8 – 28 %)	26%
5.1	5.Management	Oversight of climate change issues	2%	2%
5.2		Climate change oversight capability	1%	1%
5.3		Low-carbon transition plan	3%	3%
5.4		Climate change management incentives	1%	1%
5.5		Climate change scenario testing	3%	3%
6.1	6.Supplier engagement	Strategy to influence suppliers to reduce their GHG emissions	Weight _{M6} x 50% (2 – 4 %)	3%
6.2		Activities to influence suppliers to reduce their GHG emissions	Weight _{M6} x 50% (2 – 4 %)	4%
7.1	7. Client engagement	Strategy to influence customer behaviour to reduce their GHG emissions	Weight _{M7} x 50% (2 – 4 %)	3%
7.2		Activities to influence customer behaviour to reduce their GHG emissions	Weight _{M7} x 50% (2 – 4 %)	3%
8.1	8.Policy Engagement	Company policy on engagement with trade associations	1%	1%
8.2		Trade associations supported do not have climate-negative activities or positions	1%	1%
8.3		Position on significant climate policies	1%	1%

9.1	9. Business model	Low-carbon business activities that aim at increasing energy efficiency and the use of low-carbon energy or optimizing of the process	4% for hollow glass 3% for fibreglass and flat glass	4%
9.2		Low-carbon business activities that aim at developing synergies with other industries (only for flat glass and fibreglass)	6%	7%
9.3		Low-carbon business activities that aim at developing the circular economy (collecting, recycling and reuse)	7% for hollow glass 3% for fibreglass and flat glass	
9.4		Low-carbon business activities that aim at reducing the structural barriers to market penetration of low-carbon products without degrading the performance of the product	4% for hollow glass 3% for fibreglass and flat glass	4%
TOTAL			100%	100%

* Glass producers who only produce borosilicate glass cannot use post-consumer cullet. Indicator 2.5 is therefore not relevant for them at the moment.

1.3. RESULTS OF THE COMPANY ASSESSMENTS

INTRODUCTION

This section presents the results of the ACT Glass Methodology road test, conducted on 14 companies.



This summary includes an overall comparison of results per module and a brief outlook on the indicator-level results per company.

The road test revealed that for Modules 3 and 9, many companies reported the data being requested as commercially sensitive, particularly in terms of details regarding the new business models, and expenditures in low-carbon technologies and research and development in low-carbon solutions. As a result, the quantitative modules were sometimes assessed with incomplete data and narrative scores have been decreased in cases of incomplete justification. Here, it is important to note that low scores may indicate a lack of transparency as opposed to underperformance. To identify how non-disclosure may have affected module and indicator results per company, we have included graphs displaying which indicators were completed per module and per company, for each indicator.

OVERALL RESULTS

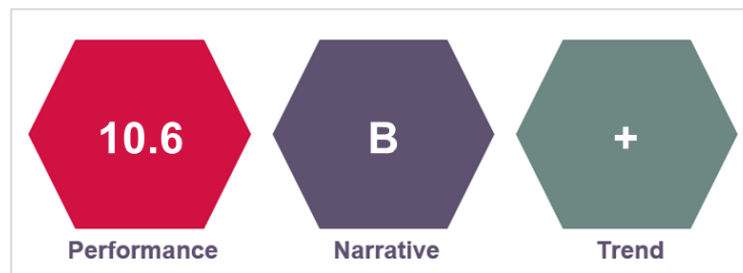


FIGURE 4: OVERALL RESULTS

Regarding the scope of the analysis, one company (based on public data) was excluded from the calculation of results because of incomplete data that would have brought the average score down. The final number of analysed companies is thus 14, with 4 companies analysed based on public data. The average final score for each score criterion is 10.6B+, where 13.9A+ was the highest and 8.1C+ the lowest score.

The average performance score was 10.6 where 13.9 was the highest and 8.1 the lowest score (Figure 5). 8 out of 14 companies achieved a performance score above 50%. The top performer's score is driven by its effective strategy aimed at modernizing its furnace fleet in order to increase efficiency and electrify part of the fleet in the short term, with ambitious GHG emissions reduction targets and exhaustive scope of actions (including upstream scope 3 emissions). It is also a result of more transparency in the company's disclosure, as it provided information and complete elements of justification for all indicators. Conversely, some companies struggled to achieve a good performance score due to their GHG emissions reduction targets not being ambitious enough to align with their company pathway, and lack of investments towards the modernization of furnaces. The lack of focus on upstream scope 3 emissions, resulting in low scores for modules 4 and 6, was also a significant factor in the final score for a large number of companies.

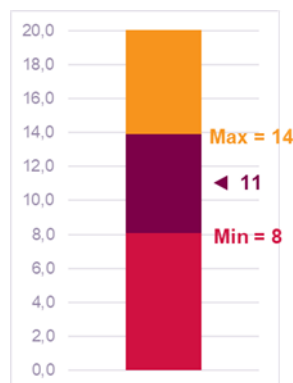


FIGURE 5: FINAL PERFORMANCE SCORES – GLASS SECTOR

The average narrative score was B, indicating an overall high alignment with a low-carbon scenario. In general, companies received higher narrative scores for the Business model and strategy and Reputation criteria, showing a concrete trend among glass companies that are starting to set climate targets and implement changes in their business model in line with these objectives. On the other hand, companies received lower narrative scores for the Risk criterion, where analysts noted the issues linked with the high energy intensity of the glass sector and the difficulties to effectively implement a climate transition, even if ambitious targets are set. A few companies were also downgraded due to lack of consistency of their low-carbon transition plan. Here, the analysis showed that some companies struggled to mobilize adequate resources to support stated climate ambitions, in terms of material and intangible capital expenditure. Some

company scores were also artificially decreased through the Risk criterion to account for the fact that they failed to give sufficient proof for the data they provided (documents, reports, etc.) while still being credible enough according to the analyst. In conclusion, only a few companies have conducted a robust and comprehensive risk analysis related to their low-carbon transition, which diminishes their credibility to effectively reduce their GHG emissions.

The average trend score was rated positive (+) for the glass sector. This indicates that companies are moving closer towards alignment with their low-carbon pathway and it is very likely that this trend will be confirmed in the near future if the companies are assessed again. This score reflects the nascent low-carbon transition plans that are being implemented by almost all companies that have been assessed. The assessed companies have already begun to incorporate climate issues in their management processes and are progressively developing programs, particularly in term of CAPEX and scope 3 interventions, that will come to fruition in the near future

OVERALL PROFILE OF THE 5 ACT DIMENSIONS

Like all ACT road tests, the glass road test provides a snapshot of sector performance in each of the 5 ACT dimensions (see Figure 6). The following paragraphs summarize sector-level trends and challenges in these 5 elements. These insights do not apply uniformly to all participating companies and should not be interpreted as indicative of individual company performance. This is a high-level analysis of common trends identified throughout the road test. Company-specific insights are given in the company feedback reports, which are not publicly available.



FIGURE 6: ACT ASSESSMENT FRAMEWORK

Commitment

All glass manufacturers analysed have set emissions reduction targets. However, some commitments lack long-term horizons and intermediate targets. Even among the few long-term targets, such as “net-zero by 2050”, the road test pointed to a lack of detail, preventing companies from obtaining higher scores in the dedicated module. The road test also highlighted a lack of targets covering scope 3 emissions. Companies must commit to reducing their upstream emissions, considering their high proportion in total emissions.

Transition plan

Companies in the sector reported exploring low-carbon business activities (circular economy, electrification, alternative fuels, etc.), with an overall good level of maturity among companies. From a strategic planning perspective, companies in the sector have developed schemes to increase the efficiency of their furnace fleet and effectively decrease the emissions intensity of their produced glass. However, the investment plan often doesn't match the required pace to meet low-carbon standards, resulting in locked-in emissions and increased risk of failing to achieve climate ambitions. Some gaps have been identified between targets set by companies (Module 1) and the ambition of transition plans in aligning with a low-carbon economy (Module 2). Moreover, some of them chose not to disclose details of the profitability of their future low-carbon business models, limiting the analysis. As for upstream scope 3 emissions, companies are currently far behind low-carbon expectations but interventions to drive suppliers towards setting emissions reduction targets are expected to be developed in the coming years.

Present

Most companies have developed sustainability strategies to tackle their climate impacts and established oversight of climate issues at a high level of responsibility within the company. A very small sub-set of companies have already started to significantly increase the share of alternatives fuels used in their furnaces (electricity, low-carbon hydrogen, biomass, etc.), but for most of companies there are still a lot of challenges linked with the maturity of the low-carbon furnace technologies and the lifetime of current assets. Most of the companies assessed do not mobilise all the decarbonisation levers that do not require the renovation of furnaces (partial electrification, decarbonisation of raw materials, improvement of process efficiency, engagement of suppliers, etc.) and that can be implemented in the short-term.

Legacy

Past performance is fairly low for almost all analysed companies. Some companies are just starting their sustainability journey and few companies have set emissions reduction targets in the past. Overall, the sector is not widely recognised for previous achievements in tackling its climate impact, but all companies are implementing sustainability strategies, and this is consistent with the ACT assessment results.

Consistency

Overall, assessments have shown that climate strategies were fairly consistent for each company and reflected the level of maturity of the company. However, analysts have noted the inadequacy between the stated climate ambitions and the concrete actions that are put in place. Only few companies have enough material investment planned for the near future to match the ambition of their sustainability strategies. Additionally, very few companies are investing substantial CAPEX in R&D to facilitate and ensure the future modernization of furnaces. This highlights the challenges at stake in an industrial sector that is both highly energy-intensive and where low-carbon technologies are not yet widespread.

AVERAGE RATINGS PER MODULE FOR THE PERFORMANCE SCORE

Overall, the sector had a medium performance in the ACT assessment (see [FIGURE 7](#)). 4 modules had average scores below 50% and 5 modules had average scores above this threshold. Quantitative modules (modules 1-4) have lower average scores than qualitative modules (modules 5-9). The lowest-scoring modules were **Module 3. Intangible investment** and **Module 4. Sold Product Performance**.

The lower overall results in the quantitative modules are impacted by the lack of data for Module 3 and by the lack of interventions regarding scope 3 for Module 4. As noted for Module 3, participating companies considered the information requested to be confidential and/or difficult to obtain with a high level of precision. Disclosure for the qualitative modules (5-9) was more complete. And, while companies had multiple comments on the concepts and definitions used throughout the data collection tool, most participants provided

relevant information for the assessment of these modules. Higher achievement in the qualitative modules indicates companies have implemented sustainability strategies and are reporting them for the assessment. High scores in 5. Management and 8. Policy engagement show the sector has implemented internal organisational structures that are tasked with overseeing climate change initiatives at a corporate level. The road test found the main challenges lie in the effectiveness of said sustainability strategies.

The details of the score obtained for each module are given in the following paragraphs.

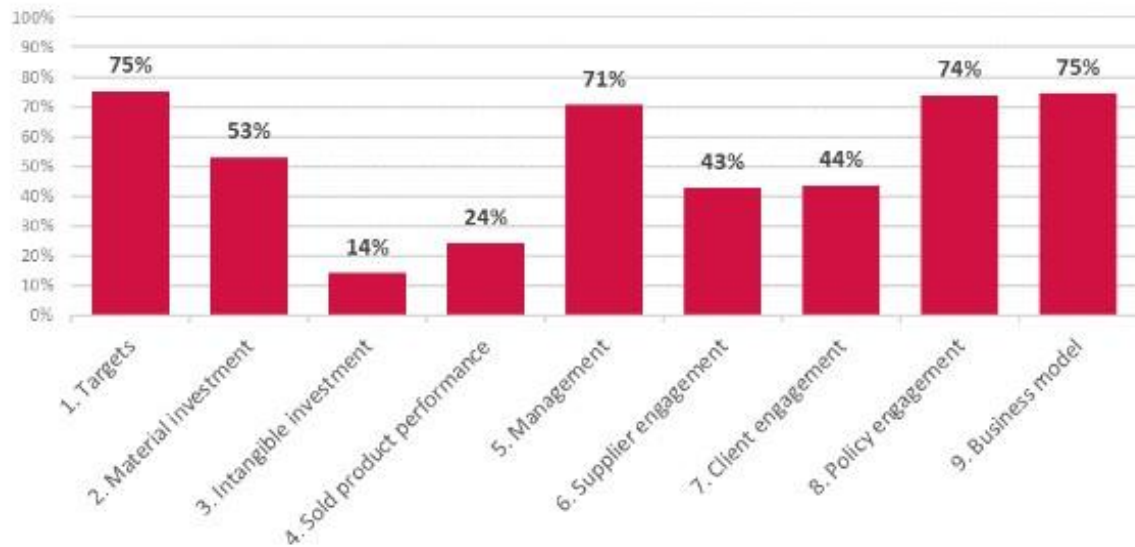


FIGURE 7: AVERAGE SCORES PER MODULE - GLASS SECTOR

MODULE 1. TARGETS (75%)



Indicator ID	Indicator name	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.1	Alignment of relevant scope emissions reduction targets	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
1.2	Time horizon of targets	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
1.3	Achievement of previous and current targets	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Yellow	Green	Yellow

TABLE 3: MODULE 1. COMPLETION RATE

Module 1 assesses a company's long-term targets and aims to compare these with low carbon standards. All companies reported their targets. The overall average score was 75%.



FIGURE 8: MODULE 1. TARGETS

7 companies obtained a score higher than 80% in this module. Most of these high scores are explained by companies using the SBTi to validate targets and define ambitious low-carbon pathways.

Despite having set emissions reduction targets, several companies obtained low scores because these targets did not align with the relevant low-carbon pathway.

2 types of companies are thus highlighted:

- Companies (5 out of 14) that set a long-term target (often to achieve carbon neutrality by 2050). For these companies, the next steps involve differentiating these net zero targets into two separate targets - one associated with reducing emissions and the other with increasing carbon removals - and set intermediate targets to improve the chances of success. Many of these companies also have scope 3 targets.
- Companies (9 out of 14) that only have medium-term targets. For these companies, the challenge is to set long-term targets with adequate intermediate targets and introduce scope 3 targets.

MODULE 2. MATERIAL INVESTMENT (53%)

Module 2 measures material investments in low-carbon activities and technologies. It calculates the performances as well as the locked-in emissions linked with the furnace fleet. It also evaluates the level of maturity of the company regarding the decarbonisation of the energy mix and integration of recycled content.

For companies assessed on publicly available data, indicator 2.2 regarding locked-in emissions was difficult to assess, because of confidentiality issues. For voluntary companies, concrete and detailed business plans were communicated, under the protection of the non-disclosure agreement, although several companies expressed a reluctance to do so.

complete data
incomplete data
no data

Indicator ID	Indicator name	1	2	3	4	5	6	7	8	9	10	11	12	13	14
2.1	Past performance	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Yellow	Green	Green	Green
2.2	Locked-in emissions	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Yellow	Red	Yellow	Red
2.3	Trend in future emissions intensity	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Yellow	Green	Green	Green
2.4	Alternative fuels and energy mix decarbonisation	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
2.5	Recycled content integration strategy	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green

TABLE 4: MODULE 2. COMPLETION RATE



FIGURE 9: MODULE 2. MATERIAL INVESTMENT

The best scores were obtained for indicator 2.5 Recycled content integration, showing that companies are increasingly taking into account circular economy principles in their processes (especially the recovery of pre- and post-consumer cullet), both for economic and environmental purposes. It should be noted that hollow glass manufacturers are more advanced in the integration of cullet than flat glass or fibreglass manufacturers because of their history and the cullet quality needed. Indicator 2.4 Alternative fuels and energy mix decarbonization contributed to reducing companies' overall scores. Only 4 companies scored higher than 50% and the best score obtained was 63%, suggesting that the sector indeed falls behind in terms of electrification of furnaces compared to traditional fuels (e.g., natural gas). This is mainly linked with the fact that the electrification of furnaces of other decarbonisation technologies are not yet mature and companies are currently at the stage of developing prototypes (e.g., tests for the integration of hydrogen in their processes).

Regarding past and future emissions intensity, the vast majority of companies do not have a transition plan that will allow emissions intensities to drop in the short run, for the same reasons as mentioned above. Analysts are thus recommending companies to accelerate the mobilization of all decarbonization levers that do not require the renovation of furnaces (partial electrification, improving the efficiency of processes, etc.).

MODULE 3. INTANGIBLE INVESTMENT (14%)

Module 3 measures investments in research and development of low-carbon and mitigation technologies. This module had a high non-disclosure rate because some companies are not willing to share their expenditure in future R&D, and for companies assessed on public data this information was too confidential to be retrieved. Companies are also required to present expenditure figures in “mature” and “non-mature” technologies. The methodology gave clear examples of “mature” technologies and “non-mature” technologies, meaning companies did not have trouble with these definitions.

An issue that might arise when scoring these indicators is how the figures for R&D are measured and whether all companies include similar expense concepts and report them consistently. Providing clearer guidance on what elements of the R&D spendings are relevant for the ACT assessment will strengthen the quality of the information obtained and the comparability of the expenditure information provided by companies.



Indicator ID	Indicator name	1	2	3	4	5	6	7	8	9	10	11	12	13	14
3.1	R&D in climate change mitigation technologies	Green	Green	Red	Red	Red	Green	Green	Green	Green	Red	Red	Green	Red	Green
3.2	Company low carbon patenting activity	Green	Green	Red	Red	Green	Green	Red	Red	Green	Red	Red	Green	Red	Green

TABLE 5: MODULE 3. COMPLETION RATE



FIGURE 10: MODULE 3. INTANGIBLE INVESTMENT

The highest scores in this module were obtained by two companies which achieved a 38% score. Even for companies that agreed to disclose data for this module, the methodology set a benchmark with a high level of performance that companies could not align with. However, these conclusions must be put into perspective because of the difficulties encountered when assessing this module linked with the lack of available data, as specified above.

MODULE 4. SOLD PRODUCT PERFORMANCE (24%)

Module 4 analyses companies’ performance regarding scope 3 linked with purchased raw materials. Like in Module 3, some companies did not provide complete data, which made the assessment of this module more challenging (see Table 6).

This is due to the lack of maturity in monitoring processes which made the collection and the analysis of data time-consuming for companies.



Indicator ID	Indicator name	1	2	3	4	5	6	7	8	9	10	11	12	13	14
4.2	Purchased product intervention	Yellow	Red	Green	Green	Green	Green	Yellow	Yellow	Green	Green	Yellow	Green	Yellow	Yellow

TABLE 6: MODULE 4. COMPLETION RATE

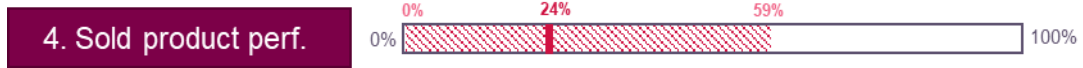


FIGURE 11: MODULE 4. SOLD PRODUCT PERFORMANCE

Only 3 companies have a score higher than 50% for this module, showing that very few companies have seriously taken into consideration challenges linked with their upstream scope 3 emissions related to their supply of raw materials. Even for those who have incorporated the decarbonization of raw materials in their sustainability strategy, most of the current interventions have a basic maturity level. The plans associated with upstream scope 3 emissions often lack targets, adequate resources and third-party certification support.

Emissions related to transportation of raw material are not monitored with a high degree of precision or emphasis. Only a few companies are either trying to use low-carbon transportation such as barge or rail, or integrating such considerations in their transition plan.

Globally, companies are progressively taking on these topics and giving them a growing focus. Some are putting in place clauses or audits that will lead to improvements in the near future. Some are also trying to source their raw materials locally but are limited by the lack of diversity and subsequent choice in supply for selected key materials such as soda ash. Finally, lots of companies are asking their suppliers about emission factors, in order to gather more information and start integrating this as a selection factor, showing that companies are likely to improve their upstream scope 3 emissions performance in the near future.

MODULE 5. MANAGEMENT (71%)

Module 5 evaluates whether companies have sound policies, structures, and oversight on climate-related issues. It is the first qualitative module and had an almost 100% completion rate in this road test, as shown in Table 7. This is one of the top four modules, with an average score of 71%.

complete data
incomplete data
no data

Indicator ID	Indicator name	1	2	3	4	5	6	7	8	9	10	11	12	13	14
5.1	Oversight of climate change issues	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
5.2	Climate change oversight capability	Green	Green	Green	Yellow	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
5.3	Low-carbon transition plan	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Yellow	Yellow	Green	Yellow
5.4	Climate change management incentives	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
5.5	Climate change scenario testing	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Red

TABLE 7: MODULE 5. COMPLETION RATE



FIGURE 12: MODULE 5. MANAGEMENT

All companies achieved very high scores in indicator 5.1, with only two failing to achieve 100%, showing that climate issues are globally managed at highest levels of responsibility and that transition plans are steered by members of the board. Most companies also received high scores in 5.4, indicating they have set monetary incentives linked to improved sustainability performance. Indicator 5.5, which evaluates companies' use of scenario testing, had the lowest scores in this module. To obtain a full score in this indicator, companies must include the financial, economic and physical parameters they consider when conducting climate-related scenario testing. Only a few companies have conducted scenario testing in order to build their long-term transition plan and financially evaluate risks associated with their low-carbon transition. One company did not disclose any information related to this.

Finally, one of the key indicators in the ACT assessment refers to the companies' low-carbon transition plans, which they describe in indicator 5.3. The results for this indicator were generally positive and suggest a positive trend in the coming years, with almost all companies scoring over 50%. Almost all companies have a low-carbon transition plan but only some of these are well defined with robust details in term of financial content, current and future considerations. Companies with the lowest scores have less detailed plans with a limited scope and time horizon.

MODULE 6. SUPPLIER ENGAGEMENT (43%)

For this module, all companies were able to give complete information (see Table 8). This module scores the companies' strategies and actions to influence suppliers to improve their sustainability performance. Indicators evaluate the strategy and activities companies are implementing to encourage suppliers to decrease their GHG emissions.

complete data
incomplete data
no data

Indicator ID	Indicator name	1	2	3	4	5	6	7	8	9	10	11	12	13	14
6.1	Strategy to influence suppliers to reduce their GHG emissions														
6.2	Activities to influence suppliers to reduce their GHG emissions														

TABLE 8: MODULE 6. COMPLETION RATE

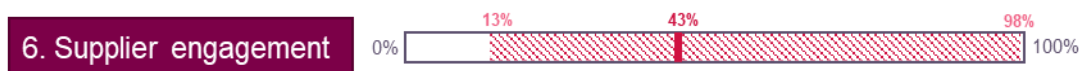


FIGURE 13: MODULE 6. SUPPLIER ENGAGEMENT

Results for this indicator were fairly low, demonstrating the lack of maturity regarding suppliers in the sustainability strategies of glass companies. Only one company scored above 80% with low-carbon aligned actions aimed at improving their suppliers' climate change impacts (see Figure 13). Even if companies are starting to take climate-related matters into consideration in their relations with suppliers, 9 out of 14 companies scored less than 50%. These companies have not yet implemented partnerships to define common reduction plans, help their suppliers develop low-carbon products, or implement supplier selection based on environmental criteria, on a systematic basis. As the completion rate for this module is 100%, this conclusion is not compromised by a lack of data availability. In general, companies scored better for indicator 6.1 (Strategies to influence suppliers to reduce their GHG emissions), by a slight margin.

MODULE 7. CLIENT ENGAGEMENT (44%)

As shown in Table 9, all companies except one provided full responses for Module 7. This module assesses companies' strategy and activities to influence customer behaviour to reduce their GHG emissions.

complete data
incomplete data
no data

Indicator ID	Indicator name	1	2	3	4	5	6	7	8	9	10	11	12	13	14
7.1	Strategy to influence customer behaviour to reduce their GHG emissions	complete data	complete data	complete data	complete data	complete data	complete data	complete data	complete data	complete data	complete data	complete data	complete data	complete data	complete data
7.2	Activities to influence customer behaviour to reduce their GHG emissions	complete data	complete data	complete data	complete data	complete data	complete data	complete data	complete data	complete data	complete data	complete data	no data	complete data	complete data

TABLE 9: MODULE 7. COMPLETION RATE



FIGURE 14: MODULE 7. CLIENT

Results for this module were highly variable, ranging from 15% to 74% (incomplete data excluded). In general, companies scored similarly in both indicators, suggesting that the depth of their strategies matches the activities they have devised to engage their clients. Low-carbon aligned criteria require a company to implement a mix of actions to encourage customers to reduce their climate impact, including awareness and education campaigns, monetary incentives, offering low-carbon products, etc. Most companies reported implementing only some of these action levers. Companies reported that clients represent a small part of carbon emission in the glass value chain thus explaining why they didn't put a focus on client engagement when designing sustainability strategies. Therefore, the road test average score is 44% in this module, indicating that companies need to strengthen and broaden the reach of their client engagement activities and strategies.

MODULE 8. POLICY ENGAGEMENT (74%)

All companies except two responded fully to Module 8. Policy engagement (see Table 10). The module evaluates companies' engagement with trade associations and their public positions on climate policies. Indicator 8.1 requires companies to disclose their internal policies for joining and influencing trade associations. Companies are asked for information on their internal policy and processes for interacting with trade associations. Indicator 8.2 asks if the company supports trade associations with climate-negative positions, but the criteria set by the maturity matrix do not list which associations have climate-negative positions, or which would be the topics and positions considered climate-negative. As currently articulated and phrased, companies can score very well on this basis, which was the case in this road test.

Similarly, indicator 8.3 assesses the public stance of the assessed companies on climate policies. No evidence of a negative public stance on climate was found.

complete data
incomplete data
no data

Indicator ID	Indicator name	1	2	3	4	5	6	7	8	9	10	11	12	13
8.1	Company policy on engagement with trade associations	Green	Green	Green	Green	Green	Green	Red	Red	Green	Green	Green	Green	Green
8.2	Trade associations supported do not have climate-negative activities or positions	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
8.3	Position on significant climate policies	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green

TABLE 10: MODULE 8 COMPLETION RATE



FIGURE 15: MODULE 8. POLICY ENGAGEMENT

Several companies addressed all the requested information and, therefore, obtained very high scores (see Figure 15). The module's average score was 74%. Companies scored using publicly available information did not always disclose their policies and processes for joining, influencing, and addressing inconsistencies with trade associations, which affected their scores. Two companies did not report any publicly available policy for engaging with trade associations, resulting in low scores in 8.1, and overall low scores compared to the module average.

All but four companies obtained 100% in indicator 8.2. This was partly a result of the question scoring criteria being very broad and further guidance on which sources to search to review companies' policy positions would help to make the assessment stricter. Mostly good scores were obtained for indicator 8.3, with only one company obtaining less than 75% in this indicator. For the most part, companies reported they support international low-carbon commitments, but fewer companies reported leading cross-sectoral initiatives against climate change.

MODULE 9. BUSINESS MODEL (75%)

All companies responded to all indicators in Module 9 but three of them gave incomplete information, as displayed in Table 11. This module aims to evaluate new business activities that are being undertaken for the low-carbon transition. It evaluates activities that aim at increasing energy efficiency and the use of low-carbon energy, developing circular economy and eco-design principles. Analysts sometimes found these indicators to be redundant, in the way they are currently phrased, due to what had already been assessed in quantitative modules. This means that companies often receive positive scores even if they are not necessarily developing disruptive, low-carbon business models. There is then a risk of falsely inflated scores. Therefore, further guidance on what should be included and not included in the scope of this module would provide analysts with a more solid foundation for carrying out the analysis.

While most companies provided information and reported some activities for all the indicators, there were elements requested by the tool that companies were not willing to share. This was the case for turnover or invested capital in the business activities reported, stage of development including profitability, and how these activities fit into future business plans. Companies considered this information to be commercially sensitive.

complete data
incomplete data
no data

Indicator ID	Indicator name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
9.1	Low carbon business activities that aim at increasing energy efficiency and the use of low-carbon energy or optimizing the process	Green	Yellow	Green	Yellow	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Yellow
9.3	Low carbon business activities that aim at developing the circular economy	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
9.4	Low carbon business activities that aim at reducing the structural barriers to market penetration of low-carbon products without degrading the performance of the product	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Yellow

TABLE 11: MODULE 9. COMPLETION RATE

Completion rate for indicator 9.2 was removed from the table because of confidentiality issues, as it concerns only one type of glass.



FIGURE 16: MODULE 9. BUSINESS MODEL

The module obtained overall high scores, with an average of 75%. All companies obtained scores of 50% or above, with a high score of 94%. All companies reported activities for transitioning to low-carbon energy (9.1), developing synergies with other industries (9.2) and circular economy (9.3), with high degrees of success, leading to the redundancy mentioned above. Fewer companies are developing low-carbon products with a high degree of maturity (9.4).

The results suggest that companies are investing in alternative business activities in line with a low-carbon economy. However, these conclusions have to be put into perspective because of the overall leniency of this module.

AVERAGE ASSESSMENT RATING BY CRITERIA FOR THE NARRATIVE SCORE

The narrative score assesses the overall response of the company in four criteria: Business model and strategy, Consistency and credibility, Reputation, and Risk. Once a company’s response was reviewed and scored, analysts completed the narrative score in the tool provided by ACT. It includes the scoring criteria for each dimension using the same achievement levels as other maturity matrices, from Basic (0 points) to Low-carbon transition aligned (4 points), as shown in Figure 17.

		Basic	Standard	Advanced	Next practice	Low-carbon transition aligned
1	Business model and strategy	The company does not seem to be able to be profitable in a low-carbon economy and there is no sign of internal efforts.	The company has begun to seek profitable activities in a low-carbon economy.	The company has identified profitable activities in a low-carbon economy, and climate issues have been integrated into its business model and strategy.	The company is in transition toward profitable activities in a low-carbon economy and there is evidence that mechanisms are being put in place for this purpose.	The company's activities seem to be profitable and its short-term strategy and targets are compatible with the low-carbon transition.
2	Consistency and credibility	The past and present actions, and transition plan if there is one, do not demonstrate overall coherence and the company does not seem to be able to achieve its climate objectives. Important efforts are needed for the implementation of a low-carbon transition plan.	The past and present actions are not in line with the company's potential climate objectives. However, there is some evidence that the company already begun to consider mechanisms to implement a low-carbon transition plan.	The past and present actions demonstrate that the company has a climate ambition, but additional efforts may still be needed to achieve climate targets. The company has started to establish an action plan to improve its climate performance.	The past and present actions are coherent with the company's transition plan. Additional efforts are needed but the company has always demonstrated the will to implement the needed mechanisms to stay aligned with its climate goals.	The past and present actions are coherent and already in line or beyond with a low-carbon transition.
3	Reputation	Existence of serious or several environmental controversies harming the company's climate commitments. There is no evidence that the company is addressing or taking the controversies seriously.	Existence of minor environmental controversies. There is no evidence that the company is working to avoid this kind of controversy.	Existence of minor environmental controversies. The company has made reliable commitments to address these types of controversies.	Existence of negligible environmental controversies that do not hamper the company's climate commitments. The company has always resolved environmental controversies with due importance.	No environmental controversies.
4	Risk	There are serious risks that could undermine the company's profitability and its ability to successfully implement a low-carbon transition plan. The company does not consider climate issues related to its activities and remains passive in the face of climate risks.	There are minor risks that could undermine the company's profitability and its ability to successfully implement a low-carbon transition plan. The company has begun to consider climate issues related to its activities.	There are minor potential risks that could undermine the company's profitability and its ability to successfully implement a low-carbon transition plan. However, there is evidence that the company is directing efforts to reduce these risks.	Risks that could undermine the company's profitability and its ability to implement a low-carbon transition plan are very limited. In addition, the company has always addressed and considered climate risks in its strategy.	No potential risk to the future profitability of the company or its ability to implement its transition to a low-carbon economic model.

FIGURE 17: NARRATIVE SCORING MATURITY MATRIX

The final average narrative score for the sector is B, suggesting that companies have an overall high performance and are initiating their journey toward a low-carbon economy. As mentioned previously, this score is calculated by assessing each scoring criterion with a maximum score of 4 points. Figure 18 shows the scores obtained per criterion, including the averages. Reputation and Business model and strategy were the best scored criteria, obtaining an average score of 3.6 and 3.2 respectively. These high scores show that companies have started their transition toward a low-carbon business economy, without having been involved in any major environmental controversies. However, a medium score was obtained for Consistency and credibility, showing that the resources mobilized for the transition of the company are not perfectly in line with the ambitious targets, in terms of material and intangible CAPEX as well as in terms of interventions regarding upstream scope 3 emissions. In order to improve the score for this indicator, companies need to accelerate the pace of their transition to align their efforts with their objectives. The Risk criterion obtained the lowest average score, with 1.9, below 50% achievement. The low score was affected by companies failing to report an advanced level of justification, thus degrading the analyst’s confidence in the overall evaluation, and by the inconsistency in scenario testing (in future evaluations, these two inputs will impact the credibility criteria for lack of data and consistency for lack of consistency in scenario testing).

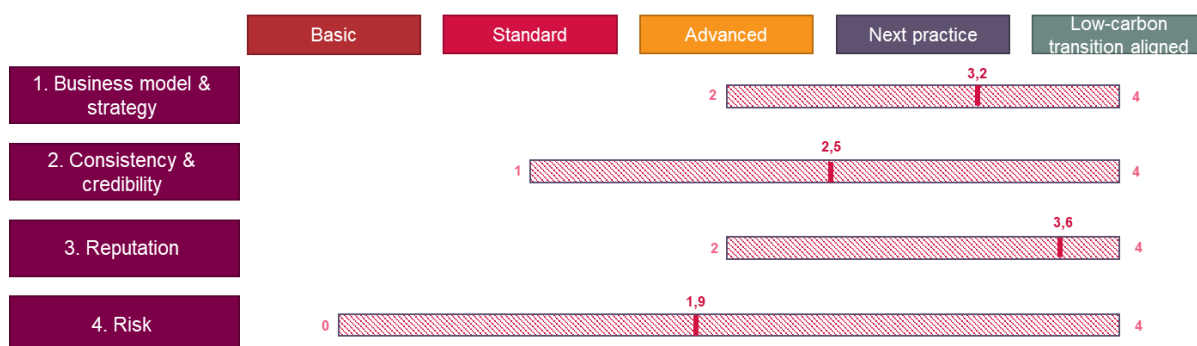


FIGURE 18: NARRATIVE ASSESSMENT SCORES – PER CRITERION

Final narrative scores

The average narrative score obtained was 13.6, which is equivalent to a medium B letter score. Five companies obtained an A with similar structure in their scores. The two top-scoring companies had solid results in the Business model and strategy criterion, thanks to highly ambitious targets, supported by a well detailed and exhaustive transition plan that is monitored at highest levels of decision-making within the organisation.

The minimum rating obtained was a C score, which is also the most obtained score (six companies), suggesting that there is a medium variance in companies’ narrative assessments. Lot of companies are still lagging behind in the implementation of adequate resources and risk analysis in order to effectively reduce their emissions at a pace consistent with the goals of the Paris Agreement. Companies in the sector should work on increasing transparency on their sensitive data (material and intangible investments, as well as business models), boosting the means dedicated to the achievement of emissions reduction targets, and increasing their understanding of climate-related risks affecting their future business activities.

AREAS OF IMPROVEMENT AND TREND SCORE

12 out of 14 companies obtained a positive trend score. All these companies reported relevant investments in low-carbon furnaces and are working to substantially decarbonize their energy mix as well as increasing the recycled content in their production mix. Most of these announced investments will come to fruition in the medium term, hence the strong confidence in the future improvement of the companies' climate performance. These companies are also starting to incorporate suppliers and customers in their sustainability strategies and extend the scope of their transition plan to scope 3 considerations, notably regarding the batch composition and supply of raw materials.

However, the sector faces serious challenges, linked with the inherently slow pace of change of a heavy industrial sector. Indeed, replacing the furnace fleet (the most impactful decarbonization lever for the sector) takes time and even if companies have been evaluated with a positive trend score, substantial improvements are not expected in the short term. In the meantime, companies should focus on levers that do not require furnace replacement such as interventions on suppliers, risk analysis or R&D.

2. Conclusion and Outlook

SUCCESS OF THE ROAD TEST

- 14 assessments were performed leading to methodological improvements by better reflecting how companies report their data with a good representation of the sector, both in terms of players (Flat Glass, Hollow Glass and Fibreglass) and geographies.
- There was good engagement from many of the companies involved in the road test, including, in many cases, very thorough feedback on the data collection process and the methodology.
- The consortium believes that with some work (mainly to improve the usability of the online tool and some methodological amendments), the Glass Methodology will provide a fair reflection of a company's readiness to transition to a low-carbon economy by acutely reflecting strengths and weaknesses in a company's current strategies and actions.
- Global data collection rate is fairly satisfactory, with only a few indicators for which data collection was limited by confidentiality issues.
- The current assessment methodology illustrates clearly to companies where the main gaps / areas for improvement are and encourages much greater transparency on climate performance, strategies and transition plans and will help to raise the bar for the sector as a whole.
- The evaluated companies are generally satisfied with the road test. For example, some of them emphasised that the evaluation was a fruitful exercise, which helped them to finalise their decarbonisation strategy, or that the holistic nature of the analysis gave them a better understanding and analysis of the strategies and actions underway within their company.

LIMITS OF THE ROAD TEST

- Quality of the ACT assessment depends on the involvement of the company counterpart in gathering data. Some of the assessments were not completed to the desired standard due to a lack of

participation from the company in gathering data or the confidentiality of some data that could not be disclosed.

- Some maturity matrixes answers were partially subjective prior to updates in the methodology that have been done to improve the precision for such matrixes.
- Data confidentiality will be a challenge, for many of the companies, mainly regarding the signature of non-disclosure agreements and some specific modules (3 and 9). The methodology requires companies to disclose in full commercially sensitive information. This will likely be reflected in low scores for the given modules and potential reluctance from companies to participate in the assessment. Completion of data is indeed a key component of the credibility of the analysis. Some analyses were done on the basis of incomplete data, resulting in underestimated scores. One public evaluation could not be carried because of lack of publicly available data.

RECOMMENDATIONS TO EXTEND THE METHODOLOGY TO THE REST OF THE SECTOR

The consortium strongly recommends that before releasing the methodology, enhancements are made to the assessment material (methodology document and data collection tool). The consortium has provided a list of all the comments received by companies, and we suggest that these are considered for enhancing the methodology and associated tools. These can be found in the accompanying slide deck from the technical working group meeting. The following points summarise the key recommendations to be addressed:

- **Usability of the online tool:** without making the tool more user-friendly, analysts will continue to find it challenging to use the tool and carrying out the assessments. This could lead to a push-back on the methodology / framework itself. In particular, if the online tool and the Excel data collection questionnaire are kept as two separate documents, it would be preferable to have exactly the same format of data between both tools, so that copy / pasting is facilitated. Ideally, automatic import of the data collection questionnaire within the assessment tool would be implemented. Also, companies would like to be able to review their results in the tool, and currently the Json format is not common enough for this purpose.
- **Improve the guidance in the data collection tool:** Many exchanges between analysts and assessed companies were needed to carry out these evaluations. While such engagement is important, some could have been avoided with clearer guidance on how to complete the data collection tool.
- **Adapt the methodology for several indicators:** Some indicators have been reported to be misunderstood in their current state or not complete enough to realistically assess the company's climate performance. Some changes have been proposed by the consortium on such indicators:
 - Emissions intensity metric (general) – Melted tonnes for flat glass, packed tonnes for fibreglass and hollow glass (except for flacottage and borosilicate glass), and pulled tonnes for flacottage and borosilicate glass.
 - Energy mix decarbonization (2.4) – New hierarchy of level of commitments regarding the low-carbon electricity indicator, with associated score (0% for electricity with no certification to 100% for electricity originating from company's low-carbon on-site generation). Score for this indicator is calculated with a weighted average computing the percentage of electricity consumed from the source at corporate level and the score associated with its level of commitment.

- Purchased product interventions (4.2) – Exclusion of energy from the list of raw materials assessed in this module, as it is indirectly assessed in indicator 2.4 (Alternative fuels and energy mix decarbonisation). Use “reporting year-5”, as well as the time horizon of the action plan of the company to measure the trend of the evolution of GHG emissions related to the transport of the purchased product.
 - Recycled content strategy (2.5) – Focus on external pre-consumer cullet and modification of the maturity matrix to remove the notion of waste hierarchy. Modification of the weightings relative to Module 2 for companies that produce borosilicate glass.
 - Intangible investments (3.1) – Add a new sub-indicator with an extension of the analysed period to include future years.
 - Business models (9) – Add a list of “others business models” that will not be assessed in this module.
- **Clarify the maturity matrixes in the qualitative modules:** Analysts received recurrent feedback from companies about unclear questions and subsequent difficulties to identify the correct maturity level in the maturity matrices.

CONTRIBUTION OF ACT TO ENGAGING COMPANIES IN THE LOW-CARBON TRANSITION

Throughout the road test, most companies showed interest in completing the assessment and acknowledged the role of ACT in encouraging greater shifts within the sector, in relation to increased transparency and ambition around low-carbon transition plans. In addition, companies provided feedback on the assessment methodology and tools. With a few exceptions, companies in the road test demonstrated they are working towards developing and implementing effective sustainability strategies, but that there is some way to go before these 1) reach the level of ambition required to align with a low-carbon pathway, and 2) are being complemented by real actions and adequate material investments, for example in modernizing the furnace fleet.

Given this context, the following themes emerged in relation to the contribution of ACT, and the road test process, in engaging companies in the low-carbon transition:

- **Companies understand the importance of having and communicating a robust and ambitious sustainability strategy:** Almost all companies in the road test had sustainability strategies or low-carbon transition plans in the development process, but not all of them were yet finalised, published, or supported by in-depth CAPEX programs.
- **Companies are better aware of the level of transparency being called for:** Companies acknowledged that the ACT assessment is more ambitious than other frameworks, and recognise the need to update their GHG accounting and push for a higher degree of transparency in order to perform well in the assessment. However, the feedback from companies and significant data confidentiality concerns suggests it will take some time for them to adjust to this new standard.
- **Companies have a better understanding of the relevant actions and good practices to be implemented to accelerate their carbon transition.** In fact, the analysts highlighted the areas of improvement for each assessed company in the feedback reports.