2021

U.N.-Convened Net-Zero Asset Owner Alliance

TARGET SETTING PROTOCOL - V2 ADDITIONS AND REVISIONS CONSULTATION

RELEASED: OCT 11 2021 TO OCT 29 2021 FOR PUBLIC CONSULTATION

Members of the Net-Zero Asset Owner Alliance invite the public to comment on new additions and revisions to the Net Zero Asset Owner Alliance Protocol for inclusion in a second version which will be released in Q1 2022.

This Consultation will run from 11 October to 29 October 2021. The general public is invited to submit input via the https://forms.office.com/r/9RGpdeN41q.

This Consultation covers the following new addition:

1. Infrastructure Target Setting Approach
2. Own/Operational Scope 1 and 2 inclusion

The Consultation also covers revisions to the following existing chapter:

1. Real Estate (revisions highlighted)
2. Sector Targets
3. Engagement Chapter – CA100+ Benchmark discussion

Note, UN-NZAOA/AOA is working with PCAF to issue a consultation on Sovereign Debt Accounting, please check https://carbonaccountingfinancials.com/, to be included in Version 2 of the AOA Protocol.

Additional edits will be made to the Protocol but do not require consultation.

Alliance Protocol Consultation Webinar

In this webinar the AOA members will discuss the suggested revisions and additions including an approach for Infrastructure, adjustments to real estate and sector target setting, among others. The NZAOA invites comments and input.

Live Oct 25 1:00 pm Switzerland - Zurich or after on demand
Register here

[New] Infrastructure

Term	Definition
Asset Class	The Alliance recommends that members set emission reduction targets on infrastructure assets, typically pertaining to an infrastructure entity, where they have >20% ownership. For lower ownership shares and debt investments targets shall be phased in achieving full coverage by 2025 at the latest.
Asset Class Definition	An infrastructure investment is defined as being an investment in an entity or corporate group which derives the substantial majority (i.e. more than 2/3rds) of its revenues from owning, financing, developing or operating infrastructure assets. Infrastructure assets mean physical assets, structures or facilities, systems and networks that provide or support essential public services.
Asset Types	See table X.X below
Scope of Emissions	Targets are recommended to be set on annual Scope 1 and 2 emissions, plus, wherever possible, Scope 3 emissions.
Target	The output will be an emission target at the portfolio or asset class level, in line with practice for public equity and listed corporate debt. The recommended target metric is owned emissions via equity and debt (in line with PCAF).
Approach	As a science-based scenario is required, the use of sector-specific pathways[1] is recommended where applicable, and the global average of IPCC P1-P3 scenarios where sector-specific pathways are not available.
Greenfield	Construction of new assets or re-constructing an existing asset to a material extent. Example include new roads, new railway connections, new windmills, as well as for example, re-constructing a coal power plant into a gas power plant.
Brownfield	All other projects which are not Greenfield.

Definition of Infrastructure

The Alliance reviewed a wide range of infrastructure definitions[2] and agreed to utilise the Solvency II definition as follows:

An infrastructure investment is defined as being an investment in an entity or corporate group which derives the substantial majority of its revenues from owning, financing, developing or operating infrastructure assets. Infrastructure assets mean physical assets, structures or facilities, systems and networks that provide or support essential public services.

Source: Solvency II amending Delegated Regulation (EU) 2015/35 issued by the European Commission on 8 June 2017 (points 55a and 55b of Article 1)[3]

While the following features are in no way prescriptive, however, infrastructure assets may sometimes be characterised by being; illiquid, capital intensive, having income that is stable and predictable over the long-term, a natural monopoly or have a strong competitive position often as a result of having inelastic demand, and include risk profiles that may depend on maturity.

[1] See Sector Chapter X.X for more details on available sector specific scenarios.

[2] Global, regional and in-house definitions were considered.

[3] The Solvency II regulations further provide a list of criteria under Article 164a that such investments have to meet in order to be classified as a 'Qualifying'. By public services we mean electricity, water and so on as described in Table X.X below, irrespective as to whether the purchaser is a single private entity (e.g. a power plant which sells all production to a single company rather than the public).

The Alliance uses greenfield to describe new infrastructure projects that lack the constraints of prior work and existing infrastructure assets undergoing major CAPEX (e.g. repowering). All other infrastructure assets are considered brownfield.

The Alliance recognises that AOs may hold infrastructure assets, either listed or unlisted, across different asset classes within their portfolios. This chapter is written from the perspective of a stand-alone, unlisted infrastructure asset class. AOs will need to decide, and clearly communicate, whether infrastructure assets that sit outside their infrastructure portfolio fall under their infrastructure reduction target or sit within the target for the relevant asset class (e.g., an AO may decide that listed infrastructure within an equities portfolio falls under their equities reduction target, and is measured using the equities carbon accounting methodology).

Asset types in scope are outlined in the following Table X.X (below) with a general definition for guidance purposes only.

Infrastructure Type	Sub-type	General Definition
Power Assets and Fuel Infrastructure[4]	*Coal, Gas, Nuclear, Renewable Utilities Infrastructure, Oil/Gas pipelines & midstream infrastructure*	Energy infrastructure is the organisational structure that enables the large-scale transportation of energy from producer to consumer, as well as the directing and managing of energy flow. Energy infrastructure encompasses traditional utilities such as gas and oil pipelines, electricity transmission lines, coal trains, as well as technologies such as advanced electrical metering and distribution systems, smart building systems, and power plant control systems.
Transportation Infrastructure	*Rail networks, Airports, Road works (including bridges), Public transportation systems, Ports*	Transport infrastructure includes roads, highway systems for mass transit, public transportation systems, airports, trains, subways, and light rail systems, bridges and tunnels.
Social Infrastructure	*Public buildings*	Social Infrastructure includes public buildings or works (e.g., courts, schools, social housing).
Water Infrastructure	*Water utilities*	Water infrastructure includes water treatment plants, water supply systems, sewer systems, and/or sewage treatment facilities.
Communications Infrastructure	*Telecom utilities*	Communications infrastructure includes wireless, cable, satellite, data centres.
Waste Management Infrastructure	*Waste Management Infrastructure*	Waste management infrastructure includes infrastructure for landfills, converting waste to energy (WTE), and recycling or composting.

5.1.1. Carbon Accounting for Infrastructure

It is recommended that the carbon emission measurement of infrastructure assets[5] be aligned with the GHG Protocol. The Alliance strongly recommends the measurement of emissions for all infrastructure-related assets.

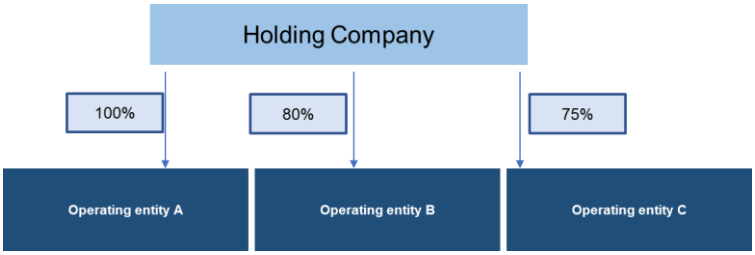
[4] In line with forthcoming Alliance position paper on Oil/Gas/Coal that no new Oil/Coal assets or capacity should be financed, permitted, developed or constructed.

[5] To improve readability, we always refer to "infrastructure assets" instead of "infrastructure assets or corporations managing or /and owning infrastructure assets".

5.1.3.1 Annual Emissions

The Alliance recommends the measurement of Scope 1 and 2 emissions on an annual basis for both brownfield and greenfield assets, in line with the GHG Protocol. Scope 3 emissions should be measured wherever possible. This is recommended for all infrastructure investments; those held via debt instruments (including Mezzanine) and those held via equity investments (both direct and indirect, including co-investments).

Projects are often structured including various operational entities (OpCos) which are owned by a holding structure (HoldCo). Investors might provide debt on both levels in addition, much more complex structuring also occurs regularly. Ownership share shall always be determined via an economically consolidated (virtual) balance sheet (see formula below) of the borrower.



The Alliance has aligned their accounting methodology with the PCAF Standard for the Financial Industry.[6] As per PCAF, AOs should determine their share of each infrastructure asset's annual emissions based on the ratio between the AO's outstanding amount (numerator) and the total equity and debt of the infrastructure asset (denominator). The outstanding amount being the amount of debt and/or equity provided by the AO.

$$\text{Portfolio owned emissions} = \sum\left(\left(\frac{\text{outstanding amount}}{\text{Total equity + debt}}\right) \text{x} \ \text{Infrastructure asset annual emissions}\right)$$

Following PCAF recommendations; in the case of debt, the outstanding amount is defined as the value of the debt the borrower owes to the lender (i.e. disbursed debt minus any repayments) while in the case of equity, the outstanding amount is the outstanding value of equity the financial institution holds in the project. It is calculated by multiplying the relative share of the financial institution in the respective project by the total equity of the respective project's balance sheet. Financial institutions should either use the calendar or financial year-end outstanding amount, provided the approach is communicated and used consistently.

Owned emissions can only be calculated for infrastructure assets where financial data is available. For assets where such data is unavailable, and owned emissions cannot be calculated, rough estimations can still be made based on region- and sector-specific average financial data and the outstanding amount. PCAF provides direction on how to estimate annual emissions in the face of data availability issues[7].

The Alliance does not recommend the use of revenue as a denominator for infrastructure assets for two reasons; i) during construction phase revenues are usually zero and ii) for many regulated assets the revenues are not directly linked to output/usage measures. This differs from other asset classes where the argument can be made that revenue is linked to amount of carbon produced, for many infrastructure types this logic does not hold.

5.1.3.2 Greenfield assets and lifetime emissions

The Alliance is similarly aligned with the PCAF standard for the financial industry on lifetime emissions, which recommends that financial institutions should assess the total projected lifetime emissions for greenfield

[6] PCAF (2020), The Global GHG Accounting and Reporting Standard for the Financial Industry. First Edition. p70
[7] See page 73 of PCAF (2020), The Global GHG Accounting and Reporting Standard for the Financial Industry. First Edition. Table 5.6, options 3b and 3c.

projects in the initial year of financing.[8] Such reporting ensures transparency with regards to the emissions profile of greenfield assets the AO is sponsoring, and can be useful to identify carbon lock-in. It also ensures that AOs which provide financing to greenfield projects that is then quickly repaid (resulting in minimal "owned" operational emissions), can report the impact of these projects during their lifetime.

The Alliance strongly recommends that AOs attempt to report lifetime emissions for greenfield power assets and fuel infrastructure projects at this stage. Lifetime emissions for other assets types can be reported where possible.

For greenfield assets, it is necessary to distinguish between the different development stages (early development, construction, turn-key). Where an AO is the initial sponsor or lender in an early development greenfield infrastructure project, it is strongly recommended that AOs report estimated lifetime scope 1 and 2 emissions for the asset in the year of contracting. They should also make an assessment as to whether the purpose of the asset and its lifetime emissions are aligned with (or can be brought in line with) the general net zero ambition for 2050 (remembering in most cases the asset's lifetime will go beyond 2050). This can be done using the scenarios discussed in the Sector Chapter X.X, or other 1.5°C degree-aligned scenarios/methodologies. For investors based in the European Union the EU Taxonomy gives guidance for many business activities on how to align with net zero ambition.[9] In other jurisdictions similar taxonomies are under development.[10] AOs should not invest in assets whose purpose is not aligned/cannot be quickly aligned with net zero ambitions.

If an AO enters an investment at a later stage (construction or turn-key), the Alliance recommends AOs report estimated lifetime scope 1 and 2 emissions for the asset in the year of contracting. For this kind of investment an assessment as to whether the purpose of the asset and its lifetime emissions are aligned with (or can be brought in line with) the general net zero ambition for 2050 is also recommended.

Existing greenfield investments of any kind invested via a fund structure do not currently require an estimate of lifetime emissions. This is due to the low level of influence combined with the fact that most AOs will not have existing reporting requirements in place. However, the Alliance recommends AOs to include reporting requirements with regards to lifetime emissions for future investments via funds.

Reporting of lifetime emissions should be separate to reporting of annual emissions. Once a greenfield project becomes operational, the AO would report annual operational emissions as per 5.1.3.1.

Target Setting for Infrastructure

There are multiple ways in which AOs are exposed to infrastructure as an asset class and the level of influence usually depends on the type of investment. In general, equity owners tend to have more influence than debt holders. For equity owners, direct ownership provides more influence than indirect (via fund structures), and for direct equity owners the level of influence is strongly related to the ownership share (i.e., majority stake owners tend to have greater influence than minority stake owners).

The ability of an AO to influence an infrastructure asset may be further impacted by whether the AO holds a board seat(s), the type of fund they are invested in (open vs closed), and the line of sight they have to co-investors.

As outlined below, independent of how an AO is invested the Alliance recommends AOs take a holistic approach to carbon reductions within their infrastructure portfolios. At a minimum, it is recommended that AOs set carbon reduction targets for those assets where they own greater than 20 per cent and/or where they have a

[8] PCAF (2020), The Global GHG Accounting and Reporting Standard for the Financial Industry. First Edition. P75

[9] https://ec.europa.eu/info/sites/default/files/business_economy_euro/banking_and_finance/documents/200309-sustainable-finance-teg-final-report-taxonomy-annexes_en.pdf

[10] Also see the International Platform on Sustainable Finance which is working to align common ground among taxonomies.

seat on the board. This follows international accounting standards where significant influence is assumed.[11] In conjunction with this, it is recommended that AOs commit to engage on emission reductions with all assets annually, commit to engage with existing fund managers on setting their own emission reduction targets, and commit to ensuring by 2025 that all new fund manager appointments include net-zero/temperature alignment requirements.

Transparency around level of influence

It is recommended that AOs transparently identify those infrastructure assets where they believe they have the ability to influence carbon emissions. For most AOs it is recommended that this includes those assets where they hold a greater than a 20 per cent stake cent and/or where they have a seat on the board. At a minimum, it is these assets where AOs are recommended to set emission reduction targets.

However, AOs may also choose to utilise other means of reducing the real-world emissions of their investments, and in such cases their emissions reduction target could extend beyond only those assets where they hold a significant stake. This could include direct engagement with the assets themselves, engagement of existing asset managers, inclusion of net-zero and/or temperature alignment requirements in new manager appointments, the use of new debt instruments and so on.

Each AO should assess their portfolio and determine where they can act to reduce emissions. For those assets where an AO chooses not to set an emission reduction target, the AO should transparently explain their reasoning.

Phase in approach to emissions measurement

As per Section 5.1.3.1, the Alliance recommends AOs should measure the annual emissions of all infrastructure assets within their portfolio (regardless of whether the AO plans to set an emission reduction target for the individual asset). The Alliance realises that data availability may be an issue and that, in some cases, this may require an engagement process of its own which can take several years. In such cases, it may be necessary for AOs to have a "phase in" approach to increase the proportion of assets where emissions data is available.

In such cases, it is recommended that AOs prioritise those assets where they plan to set an emissions reduction target. Approaches to improving data availability may include direct engagement with the asset itself, engagement via asset managers, collaborative engagement with co-investors where possible. The Alliance would assume that AOs are able to report annual Scope 1 and 2 emissions for 100 per cent of their infrastructure assets by 2025.

Targets for Emission Reduction

The Alliance recommends AOs set emission reduction targets for infrastructure investments, particularly so where they believe they have the ability to influence emissions.[12] As per Section 5.1.4.1, at a minimum it is recommended that targets are set for assets where the AO holds a greater than 20 per cent stake and/or has a seat on the board. Targets shall be based on annual emissions.

Targets can be set either

- for individual infrastructure investments
- for infrastructure investments as an asset class (either jointly for equity and debt, or stand-alone)
- jointly with Corporate Bonds or Listed Equities

[11] See IAS 28.5 If an entity holds 20% or more of the voting power of the investee, it is presumed that the entity has significant influence.

[12] For Renewables (Wind, Solar, Biomass, Hydro) material emissions occur only during construction phase (e.g. embedded emissions). Emissions produced during the operation of renewable assets is usually on a very low level. Thus, we see no necessity to set reduction targets for renewables in operation.

Targets shall be expressed as a reduction in owned (financed) emissions. The Alliance recommends that AOs use sector specific pathways as far as possible to determine the ambition of reduction targets (see Section 6 on Sector targets). In cases where sector pathways are not available asset owner's ambition should be in the same range as for corporates and listed equity (see also Section 4.4.1 for base year translations). The discussion in Section 4 and 5.1 on constraints, different starting points and portfolio growth holds for this asset class as well. In practice, asset owners are recommended to choose a sector specific pathway for each individual sector or a combination where specific pathways are not possible, for example a specific sector pathway for power assets and the general reduction range for all other sectors.

Engagement and Manager Alignment

The Alliance strongly recommends that AOs engage on emission reductions with all assets within their infrastructure portfolio on an annual basis, regardless of ownership levels. This engagement should be aimed at encouraging each asset to set an emission reduction target aligned with a 1.5°C pathway. This may be direct engagement or engagement via a fund manager.

It is also recommended that AOs engage annually with existing fund managers on the importance of setting decarbonisation targets within their portfolios.

Finally, it is recommended that all new fund manager appointments include a commitment to net zero and alignment with a 1.5°C decarbonisation trajectory. The Alliance appreciates this may not be possible immediately in every jurisdiction, so it is suggested that AOs engage with new managers to align with net zero as soon as possible, working towards ensuring all new fund manager appointments are aligned from 2025 at the latest.

Consultation Questions

- Do you agree with the methodology proposed for carbon accounting for brownfield assets? Y/N-Comment
- Do you agree with the carbon emission reporting approach for greenfield assets? Y/N-Comment
- Do you agree with the definition of significant influence (>20% participations or board seat)? Y/N-Comment
- Do you think that the phase in approach for assets without significant influence until 2025 is reasonable? Y/N-Comment
- Do you agree with the decision to focus the approach on unlisted, stand-alone infrastructure assets (e.g. listed infra being covered by listed equity approach)? Y/N-Comment
- Do you have a suggestion about infrastructure assets that sit outside an infrastructure portfolio (e.g. listed infra in infra portfolio but also in equities/alt growth portfolios)? (an open comment field)
- Do you have any other suggestions (an open comment field)

The general public is invited to submit input via the https://forms.office.com/r/9RGpdeN41q.

[New] : "3.3 Asset Owner Scope Coverage"

The Protocol necessarily focuses on Portfolio Emissions (an AO's Scope 3) as the vast majority of an AO's emissions (95-97%[13]). However, the Alliance also strongly recommends all members to commit to net zero (latest 2050) with their own operational carbon footprint (Scope 1&2) as well, assessing their carbon footprint in line with the GHG-protocol and developing short- and mid-term targets as intermediate steps towards their net zero target.[14]

[2] Those AOs wishing to seek SBTi validation should follow the SBTi methodology for their operational Scope 1 and 2 GHG emissions.

Consultation Questions

- Do you agree with the proposed guidance on own operational emissions Scope 1 and 2? Y/N-Comment
- Do you have any other suggestions (an open comment field)

The general public is invited to submit input via the https://forms.office.com/r/9RGpdeN41q.

[13] various sources

[Revised changes highlighted] Real Estate

Objectives and Scope

Term	Definition
Asset Class	The Alliance recommends that members set emissions reductions targets on fully and jointly owned Real Estate portfolios. Exposure through real estate funds, REITS etc. is not in scope in this version of the protocol. It will however, be investigated in future revisions and addressed on the basis of its materiality among Alliance members
Sectors	Commercial and Residential buildings
Scope	Targets are recommended to be set on Scope 1 and 2, plus, tenant-related Scope 3 emissions[15] from heating and electricity
Target	Includes both landlord-controlled and tenant-controlled areas in line with the overall sub-portfolio target or Carbon Risk Real Estate Monitor (CRREM) 1.5°C national pathways. The output will be an emission target at the portfolio level[16]. The recommended metrics are total financed CO_2e[17] and/or $kgCO_2e/m^2$/annum or $kgCO_2e/ft^2$/ annum
Approach	As a science-based scenario is required, the use of CRREM[18] 1.5°C pathways is recommended

Key Definitions

- **Residential buildings:** refers to private dwellings such as apartments and houses.
- **Commercial buildings:** includes for example properties related to trade, finance, retail, public administration, health, food and lodging, logistic facilities, data centers, education and commercial services.
- **Fully-owned:** includes all assets where the AO has a 100% equity ownership in portfolio during the baseline year (2019).19
- **Joint Venture:** when an asset or assets are part of a joint venture, joint operation or are in joint ownership, participants are required to report on these assets. Joint venture partners with a stake of 25% or higher are considered to have significant influence over operational initiatives and can therefore drive implementation of performance improvements.
- **Operational control:** is defined by the asset owner having the ability to introduce and implement operating policies, health and safety policies, and/or environmental policies. (This recognizes the actual capacity of the asset owner to advance decisions which can lead to a reduction in the level of CO2e emissions.)
- **Tenant Controlled area:** where a single tenant has the greatest authority to introduce and imple ment operating policies and environmental policies, the tenant should be assumed to have operational control.20
- **Scope 1:** for the purposes of this asset class refers to direct emissions from onsite fuel combustion for space heating, water heating, cooking purposes in the full building.

[15] Scope 3 emissions should be included where data is available

[16] It is recommended that members use Gross Floor Area - IPMS (International Property Management) as the standard for floor area.

[17] Attribution according to PCAF methodology [MV to specify] (PS: we should also discuss the debt/equity part as there has been questions around that. We do currently not address portfolios with mixed equity and debt)

[18] The Carbon Risk Real Estate Monitor (CRREM) is a European Horizon 2020 research and innovation project. The objective of CRREM is to accelerate the decarbonisation and climate change resilience of the EU real estate sector by providing appropriate science-based carbon reduction pathways at property, portfolio and company level. See: www.crrem.eu and www.crrem.org.

[19] Final guidance is being elaborated but the working definition would include assets held 200 of 365 days.

[20] For example, in the case of a full repairing and insuring (FRI) lease in England and Wales, the tenant has operational control meaning that the area is tenant controlled.

- **Scope 2:** for the purposes of this asset class refers to indirect emissions from purchased energy (electricity, steam, heat and cooling) for space heating, water heating, space cooling, lighting, cooking, appliances and miscellaneous equipment .
- **Scope 3:** for the purposes of this asset class refers to direct, tenant-related emissions from electricity and heating (embodied carbon, downstream, upstream not included).

Setting Target

As a science-based scenario is required, the use of CRREM 1.5°C pathways is recommended. 21 As such, an Alliance member can either set:

- a specific target for the Real Estate portfolio
  - using CRREM 1.5°C pathways; targets derived from the CRREM model allow asset owners to reflect the actual makeup of their real estate portfolios with respect to geographic loca tion and building type (such as residential and commercial)22.
  - that is independent from the CRREM model but equally recommended as long as included in the range defined by the Alliance for the sub-portfolio target (i.e. a reduction in the range of -16% to -29%)23.
- an aggregated target which combines the different asset classes (listed equity, corporate bonds and real estate), that can be expressed in the form of:
  - an absolute reduction target; or
  - an intensity-based reduction target (metric suggested is tCO2e/amount invested24).

The Alliance acknowledges that there is more than one way to measure intensity, and each metric has a different purpose. For intensity targets specifically set for the real estate portfolio, the kgCO2e/m2/annum is the recommended metric. However, if Alliance members wish to include the real estate portfolio in a combined target with other asset classes, the tCO2e/amount invested could also be utilized.

The Use of CRREM Pathways

CRREM offers the possibility to evaluate the progress of a portfolio's carbon reduction performance against reduction targets in line with the Paris Agreement (i.e. limiting global warming to 2°C / 1.5°C). CRREM offers several inputs to define a specific target for a real estate portfolio and allows for global and/or country-specific decarbonization rates.

The use of a specific target for real estate allows a better consideration of the specificities of the portfolio of each Alliance member. In this case, the member can define the target according to the geographic location of its buildings (some countries are more advanced in terms of decarbonisation of the energy mix) and the building type, which can be included in the real estate target via a bottom up approach. A member with 50% of the buildings in country A and 50% of the buildings in country B would have an aggregated target based on a 50% weight for the national pathway target for country A and country B, respectively. Additional adjustments could be made in similar ways for specific building types.
Individual member targets defined according to this approach can differ significantly as national decarbonisation targets differ significantly. As an example, the 2020–2025 emission reduction requirement in CRREM 1.5°C global pathway is 28% but national reductions vary between 15%–28% (residential) and 14%–32% (commercial).

Limitations are noted in the CRREM pathways as its current version coverage is limited to the European Union and a selected number of additional countries and regions. However, for the purposes of the Alliance with the

[21] A different pathway provider can be used by the Alliance member as long as it is aligned with a credible net-zero by 2050 model or scenario which conforms to a 1.5°C carbon budget. The Alliance is not aware of any alternatives to CRREM at this time.
[22] The CRREM pathways include scope 1, 2 and tenant-related scope 3 emissions. Members that wish to use the specific intensity (kgCO2e/m2) provided by the pathways should include the same emission scopes and use the location-based approach in their targets.
[23] The -16% -29% range has been defined as aligned with science-based requirement for the global economy to limit the temperature increase to 1.5°. See the chapter XXX for more information.
[24] The amount invested should include Equity and Fixed Income investments.

current composition of asset owners the country coverage of the CRREM model was determined to be sufficient, via the tool or via the global pathway model, to be used by the member to define their specific target.

Coverage

Where an Alliance member cannot define a target based on the total floor area under management, the member should:

- Declare in a transparent way the percentage of its real estate portfolio (in terms of percentage of total gross floor area) covered by the target.
- Declare what percentage of the emissions considered in the target that are estimated.
- Define and communicate how they intend to reach full coverage over time (a clear timeline should be defined).

As Alliance members should show a positive commitment to cooperate with tenants, all members are encouraged to track energy performance metrics and should ultimately seek to engage utilities on their supplied energy mix.

Data Availability and Estimation

Data is, as for all asset classes, a central component in the ability to set and achieve emission reduction targets. Significant differences exist between regions in terms of reported data availabil- ity for the carbon emissions and/or energy consumption, particularly when the building is occupied by third party tenants.

Reported data is preferred over inferred (proxy-based) data. Proxies may be used to cover lack of data provided these are transparent and based on robust estimation

Estimation: When annual energy consumption data is partially unavailable or unreliable for a building, estimation is allowed.

Where estimations are used, the Alliance member should disclose the proportion of data that is estimated and give an general description of the methodology used;

Members who rely on estimated data should include a strategy to collect real data and replace estimated data with real data in the coming years. A revision mechanism should be considered to allow for evolution in the target as data quality improves.

One best practice to increase the availability of data from tenants is the use of "green lease" which allows utility data sharing between tenants and landlords.

Use of market-based vs location-based approach

Alliance members can construct, calculate and report on their real estate targets using either a market-based or a location-based approach for their portfolio's scope 2 emissions.

Each method's results reflect different risks and opportunities associated with emissions from electricity use and can inform different decisions and levers to reduce emissions. It is also important to bear in mind that the choice of method can be more or less suitable depending on the use case, such as carbon-accounting, risk management and target-setting.

A **location-based method** reflects the average emissions intensity of grids on which energy consumption occurs (using mostly grid-average emission factor data). Emission factors are often defined using geographic locations. These can be based on local, subnational, or national boundaries, consistent with local power grid boundaries.

The location-based method would, in a target-setting perspective, put more emphasis on energy efficiency measures as new green electricity purchases from the grid would not count in the reduction of scope 2 emissions. This method doesn't value the effort of owners who buys green electricity via dedicated contracts

and might penalize owners with a large proportion of historical buildings that cannot easily be deeply renovated.

A **market-based method** reflects emissions from electricity that companies have purposefully chosen. It derives emission factors from contractual instruments, which include any type of contract between two parties for the sale and purchase of energy bundled with attributes about the energy generation, or for unbundled attribute claims. Markets differ as to what contractual instruments are commonly available or used by companies to purchase energy or claim specific attributes about it, but they can include energy attribute certificates (RECs, GOs, etc.), direct contracts (for both low-carbon, renewable, or fossil fuel generation), supplier-specific emission rates.

The market-based method values the choice of investors willing to pay a premium (when electricity from renewable energy is more expensive) in order to have access to green energy, whilst penalizing at the same time investors or tenants who do not choose it, because they would have to use the emission factor from the residual mix which is normally much higher than the grid-average.

The choice of method will have implications for target-setting and the levers available to Alliance members to reduce their respective portfolio's emission.

It could be argued as to whether a specific method better contributes to emission reductions in the real economy. The arguments for a location-based method relate to a better reflection of the broader transition taking place is the jurisdiction or region where the building is located and that using purchased off-site generated green electricity as means to reduce a building's emissions has limited short-term impact on real world emissions. On the other hand it could be argued that using a market-based approach could incentivize and increase in the demand for green electricity contracts which, in turn, could increase the incentives for grid-operators to conduct changes to their resource mix in order to increase the supply of green electricity.

The Alliance understands and recognizes the advantages and disadvantages of each method but has not defined a preference or recommendation as to which method the Alliance members should use in their target-setting. As all Alliance members have their specific portfolio constructions, constraints and regulatory requirements the Alliance allow for both methods to be used in the targets setting. However, the Alliance requires that members to clearly state in internal AOA reporting which method has been used for the calculation of the emissions to reach the target and ensure comparability over time. The Alliance encourages members to state which method is used in their own public reporting as well.

Regardless of method, the calculation of scope 2 emissions should follow well-recognized and established accounting standards such as the Scope 2 guidance of the GHG Protocol.

Key levers for Emission Reductions in the Real Estate Asset Class

The levers available depend on the building type and geographic exposure. Feedback suggests that the different levers can be considered according to the specificities of the buildings.

Reallocation or divestment approaches are less feasible compared to liquid asset classes. Achieving emission reductions by selling low performing buildings and acquiring better performing ones should not be the primary lever to reach targets. Instead, the approach should be reducing the carbon emission of the existing portfolios.

The key levers should be:

- Improving the buildings' energy efficiency (this lever can require capital expenditure (CAPEX) and should ideally be based on building-specific retrofit plans that lead to net-zero by 2050 at latest). The suitability of this lever depends on the average age of the portfolio, as for more recent buildings the improvement can be marginal.
- Installing on-site renewable energy sources and/or purchasing off-site generated green electricity. Switching to low-carbon energy sources can be done both through installing on-site renewable energy

(e.g. through solar panels) or purchasing off-site generated green electricity (assuming market-based approach is used)

- Tenant engagement. The use of this lever is key for buildings rented to third party tenants. The applicability of this lever depends on regulation and on the type of tenant (easier for buildings with a single large tenants). For a more fragmented portfolio, the use of green lease can help..
- Policy advocacy and grid operator engagement. Engaging with policy makers and real estate industry associations with the intention to create obligations for the disclosure of energy consumption data from tenants and to align asset owner and tenants on a common goal of reducing the carbon emissions from the building. For example, in France, for buildings with defined characteristics, regulation requires alignment between tenants and asset owners on decarbonization targets. Where possible, Alliance members should also aim to engage with grid operators, directly or through policy makers or industry associations, to accelerate the decarbonization of the grid.

The ability to work with these levers and to understand how they will impact each Alliance member's decarbonization is important. Efforts across the real estate sector will have significant regional differences and also depend on the owner structures. In particular, engagement initiatives will need to be member-specific at the local, national, or regional level.

Future Work

As a general principle, embodied emissions (e.g. from retrofits and development projects) should be included in target setting considerations. However, the availability of consistent and reliable standards and data is currently very limited. This can make it difficult to include embodied emissions in the first round of targets for Real Estate. Embodied emissions calculations (methodology, estimations, etc.) will be discussed further before being included in any sort of Alliance target.

Consultation Questions

- Do you agree with the recommended metrics for target-setting? Y/N-Comment
- Do you agree with the Alliance view on market- vs location-based approach? Y/N-Comment
- Do you think the Alliance explicitly should require/recommend one of the approaches in their target setting? If yes, why
- Do you have any further suggestions? (an open comment field)

The general public is invited to submit input via the https://forms.office.com/r/9RGpdeN41q.

[Revised changes highlighted] Sector Targets

The guidance for sector targets has four main objectives:

1. Define average carbon reduction pathways for key high emitting sectors
2. Inform member's engagement efforts, identifying desirable emissions level outcomes
3. Support investment decisions in companies implementing climate solutions designed to reduce their emission intensity and
4. Inform portfolio construction, sectoral allocation and target setting at Alliance member-level

Setting sector targets is a relatively new exercise for asset owners. We therefore recommend that asset owners progressively start implementing sector targets beginning with their most material sectors from an owned carbon emissions standpoint initially and increasing the sector coverage overtime by 2025. Asset owners should by 2025 (for 2030 targets) aim to have sector targets in place covering at least 70% of total owned emissions.

Alliance members should comply with the recommendations herein or explain why they have a coverage level below the 70% threshold. The identified threshold for setting targets at sector level should be commensurate with both the member's portfolio size and the portfolio emissions profile both in absolute and relative terms.

High emitting sectors and link to engagement

The Alliance aims at setting sector targets for the most material sectors in terms of carbon emissions. The Alliance sectors in focus were initially: (i) Energy, including Oil & Gas and Utilities; (ii) Transport (civil aviation, shipping and road); and (iii) Steel. It has now been extended to cover most other carbon intensive sectors.

Sector targets enable Alliance members to enhance the link between overall (absolute) portfolio emissions reductions and sectoral efficiency gains. Sectoral targets inform the need to invest in climate solutions, track changes in the underlying holdings in line with a net-zero trajectory, as a direct or indirect result of engagement and policy actions. This is done by tying emissions reductions in the overall portfolio to real economy sector emitters held in the portfolio. Sectors, particularly so called 'hard-to-abate' sectors, given their various roles in achieving a net-zero economy, have different sequencing in their role in the transition and thus varying rates of decarbonization over time. Ultimately it would be ideal to have sector targets for all sectors. Since the 2021 Inaugural Protocol, which covered most high emitting sectors, we have added additional sectors in the economy. These priority sectors also align with engagement track efforts. This updated list includes, but is not limited to:

- Oil & Gas
- Utilities, incl. coal (26–39% of global emissions)
- Transport
  - civil aviation (2–3% of global emissions)
  - shipping (2–3% of global emissions)
  - road transport (11–17% of global emissions)
- Materials
  - steel[51]
  - cement
  - aluminum
- Agriculture, Forestry and Fisheries
- Chemicals
- Construction and buildings
- Water utilities
- Textiles and leather

It should be noted that transport is a large component of the Oil & Gas sector's Scope 3 emissions, and the Alliance views this 'value chain' approach as a first step towards tackling Oil & Gas Scope 3 emissions. See Annex I for the NACE/GICS/BICS classification codes and their association to the sectors named above. In the first instance, Alliance members who set sectoral targets should set them in line with the engagement priority sectors described above. Alliance members who wish to set targets on additional sectors, are encouraged to do so.

Setting Sector Targets

The global carbon budget[25] as referenced by the Alliance is the cumulative amount of GHG emissions permitted until the end of the century to keep within a 1.5°C threshold. The concept supporting sector targets is to allocate this remaining carbon budget across economic sectors split by geographic locations until 2050 using a set of economic and technological assumptions compatible with 1.5°C pathways.

There are three steps involved in setting sector targets:

1. Identify the most material sectors in the investment portfolio based on owned emissions

2. Identify available carbon emission metrics for the identified sectors

Asset owners can choose from three possible types of carbon emissions metrics (either intensity or absolute emissions-based targets). They can decide to use different metrics for each sector among the three metrics described below depending on data availability.

The first metric is Product/Production metric-based sector targets which, for example, can be measured, for the steel sector, in CO2e per ton of steel produced or for the automotive sector, in CO2e per km of produced cars. We acknowledge the lack of data availability or unreliable/weak data is an issue for asset owners when it comes to using Product/Production metrics to set sector targets as the data required to set sector targets need to be sourced at a company level. One of the advantages of using the product/production specific sectors targets is that these are largely independent of economic variables such as revenue and have no market or price volatility, making it easy to track the real emission reductions in isolation, and also to compare performance between companies.

The second metric is carbon Intensity-based sector targets based on EV or Revenue, using the same calculations as described on Section 5.1 for carbon intensity. Carbon intensity-based sector metrics are easily available but are dependent upon economic variables (such as revenue), and mainly covers scope 1 and 2 in the sector decarbonization pathways.

The third metric is absolute emissions-based sector targets. The pros and cons of using such metric are described in section 5.1.2. When using absolute emissions based targets, asset owners should apply the absolute emissions sectoral pathways to the companies in their portfolio belonging to a given sector / geography.

3. Select sectoral pathways to be applied to each sector and apply target relating to the selected carbon emission metric.[26]

As described in Section 5.3 below, a small number of models / scenarios are known to provide sector decarbonisation pathways for both total CO2e emissions on scope 1 and 2 (some, such as the One Earth Climate Model, also separately describe Scope 3), and on a sector product/ production specific level using an output intensity metric. This allows an Alliance member choosing to use either the OECM (One Earth Climate Model) or the IEA (International Energy Agency) model to set sector targets[27].

We favor the use of product/production specific sector targets if data allows, and carbon-intensity targets in conjunction with absolute emission targets if appropriate data is not available. The reason for not recommending only setting targets on absolute emissions is to limit the risk of divestments and to stimulate emission reductions in the real economy.

The Alliance recommends setting targets on Scope 1 and 2, as well as tracking and reporting on Scope 3 data under the different metrics.

Scope 3 is especially material for the oil and gas sector as these are inputs for many industrial production processes. Initially, the Alliance will focus on the demand side, setting sector targets for e.g. the transportation and steel sector. Due to data availability and lack of consistent metrics for Scope 3 within the oil and gas sector, we do not currently recommend setting carbon-intensity based Scope 3 sector targets for oil and gas in the short term. To ensure that we have better, comparable Scope 3 data for the next target setting period, the Alliance will work to clarify the definition of Scope 3 emissions and provide open source data for the largest oil and gas companies within 3 years.

For the automotive sector, Scope 3 emissions can be addressed through product specific targets, such as CO2e per km of produced

[25] The IPCC special report Global Warming of 1.5˚C (SR1.5) called for a total carbon budget of 420 GtCO2 to maintain 66% chance of staying below the threshold of 1.5˚C in global average temperature rise, adjusted to account for additional warming since the beginning of the industrial era (circa 1750). More recent analysis such as the AR6 WGI Report identified this budget as 400 Gt CO2.

[26] Where governments and regulators have set required sectoral targets, these derived targets could be checked against the required sectoral targets to see if they are aligned.

[27] See detailed comparison between the sector pathways in chapter 5.3.3

automobiles.

Sector pathways (various models)

The sectoral targets are being set using scenarios and sector pathways modelled to align with a 1.5˚C carbon budget. The modelling approach provides a translation of technology development and technology use into transition and decarbonisation pathways for economic sectors. The 1.5˚C models explored include:

1. One Earth Climate Model (OECM);
2. IEA Net Zero by 2050 - A Roadmap for the Global Energy Sector; and the
3. World Economic Forum Mission Possible Partnership (WEF MPP)

The pathways have been compared in order to establish a corridor of possible quantitative targets and will also be used to corroborate the portfolio target to make sure portfolio targets and sector targets are aligned and consistent.

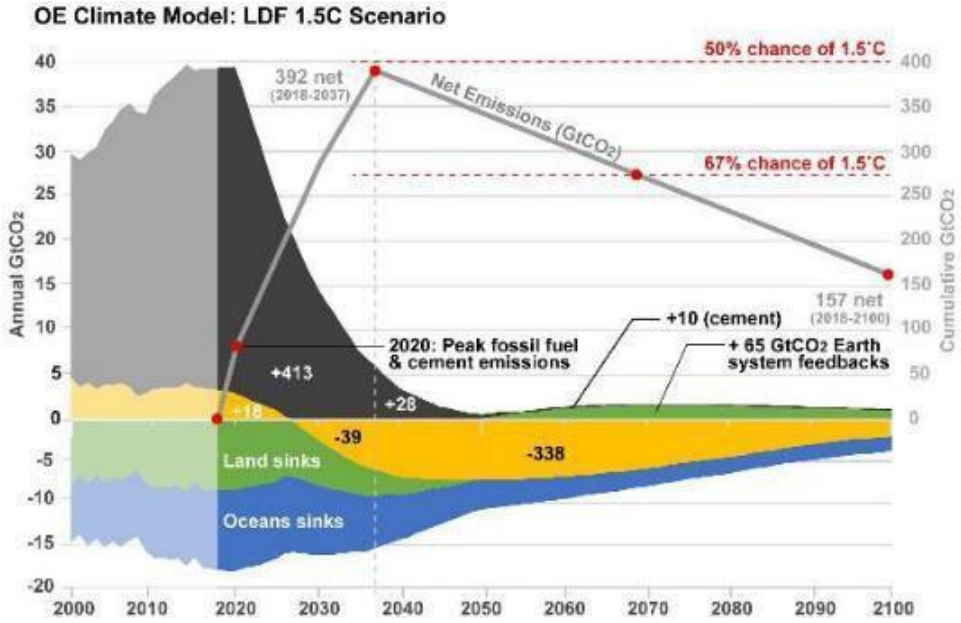
It is challenging to identify multisector models which include information at the sector level which is granular enough for target setting purposes. The Alliance continues to call upon the scientific community and other providers to continue to advance such modeling.

Model: One Earth Climate Model (OECM)

Beginning Q1 2020 and following a period of consultation with various climate modelling organisa- tions, the Alliance collaborated with the University of Technology Sydney, Institute for Sustain- able Futures' OECM.55 It has been used as a first reference case against which Alliance members could set sector targets at five-year intervals to 2050 across all economic sectors and geographic (including regional data for North America and the European region) regions.

The 1.5˚C scenario is based on the goal of limiting global warming to 1.5˚C, drawing on scenarios underpinning the IPCC's Special Report on Global Warming of 1.5˚C, and the scientific consensus around the severe risks associated with global warming even at 1.5˚C, and which will continue to increase significantly beyond 1.5˚C. The scenario aims to achieve a global energy-related CO2 emission budget of around 450 Gt, accumulated between 2015 and 2050.

The OECM (2020) shows the 1.5˚C target can be achieved through a rapid transition to 100% renewables by 2050, with renewables needing to hit 56% of the global power generation mix by 2030 under the model. The shift to renewable energy will need to be coupled with a major conservation effort to increase the resilience of natural ecosystems and boost food security. This includes a moratorium on land conversions by 2030 and nearly 400 GtCO2 of 'emissions removed' via afforestation and land restoration (shown in gold below the zero line), which pulls carbon dioxide out of the atmo- sphere and stores it in trees and the soil.



The OECM is based on a modelling cluster that provides sector specific 5-year targets compatible with a 1.5˚C pathway. The model is based on the following assumptions:

- Development of a 100% renewable energy scenario;
- De-carbonization of the entire global energy sector within one generation (until 2050);

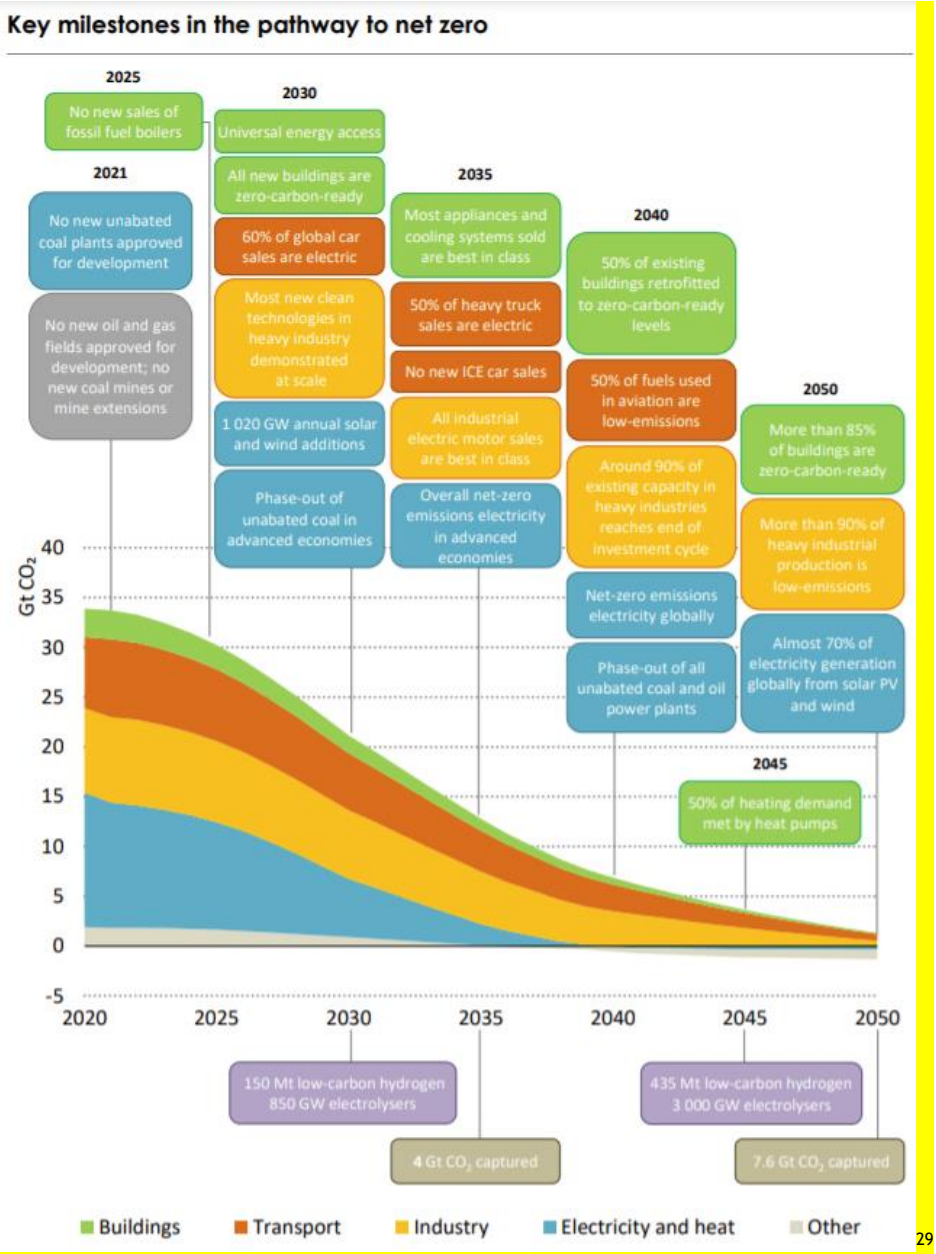
- Based only on technologies currently available or under development, excluding BECCS, CCS and nuclear energy. Note that the exclusion of CCS technology from the OECM model used to set sector targets might differ from the approach by other organisations. OECM also includes methane emissions resulting from fossil fuels mining and extraction.

The OECM-derived net-zero pathways have been peer reviewed by a number of climate modelling organisations including the Energy Transition Commission, Exponential Roadmap, Potsdam Institute for Climate Impact Research, Science Based Targets Initiative, CDP, and WWF.

The International Energy Agency (IEA) - Net Zero by 2050, A Roadmap for the Global Energy Sector

In 2021 the IEA released a special report of how to transition to a net zero energy system by 2050 while ensuring stable and affordable energy supplies, providing universal energy access, and enabling robust economic growth. It sets out a cost-effective and economically productive pathway, resulting in a clean, dynamic and resilient energy economy dominated by renewables like solar and wind instead of fossil fuels. The report also examines key uncertainties, such as the roles of bioenergy, carbon capture and behavioural changes in reaching net zero"[28]

See key milestones needed to reach net zero by 2050 in the graph below:



[29]

Comparison between the IEA Net Zero Roadmap and the OECM 1.5C-degree sector pathway [Note IEA has reviewed this material]

[28] Press release, IEA Special report - Net Zero by 2050

[29] IEA Special report - Net Zero by 2050, A Roadmap for the Global Energy Sector, page 20

The main differences between the OECM and the IEA NZ are outlined below.

The OneEarth Climate Model (OECM) is a SSP 1 scenario as defined by the IPCC: SSP1 which is a scenario in which social, business and technological innovations result in lower energy demand up to 2050 while living standards rise, especially in the southern hemisphere. A downsized energy system enables rapid decarbonization of energy supply. Afforestation is the only carbon dioxide removal option considered; neither fossil fuels with CCS nor BECCS are used.

OECM avoids a carbon budget overshoot and expands 'natural carbon sinks' (e.g. forest, mangroves & seaweed) to achieve negative emissions to compensate process emissions which are currently un-avoidable (with currently available technologies).

Key features of the OECM include:

- Cumulative Energy related CO2 emission until 2050: 455 Gt CO2.
- Overall cumulative negative emissions via natural carbon sinks: (-) 86 Gt CO2.
- The OECM include 50 GHG gases – including over 30 CFCs and HFCs as well as Black Carbon

The energy pathway of IEA Net Zero by 2050 scenario classifies (partly) as an IPCC SSP2 scenario which is defined as "a scenario with a broad focus on sustainability including energy intensity, human development, economic convergence and international cooperation, as well as shifts towards sustainable and healthy consumption patterns, low-carbon technology innovation, and well-managed land systems with limited societal acceptability for BECCS. Land-use scenarios and all other non-energy greenhouse gases (GHG) including over 30 substances that fall under the Montreal protocol are not included.

Key features of the IEA Net Zero scenario:

- The Net-Zero Emissions by 2050 Scenario (NZE) is designed to show what is needed across the main sectors by various actors, and by when, for the world to achieve net-zero energy- related and industrial process CO2 emissions by 2050. Cumulative global energy-related and industrial process CO2 emissions between 2020 and 2050 amount to just over 460 Gt; the NZE also aims to minimise methane emissions from the energy sector. Alongside corresponding reductions in GHG emissions from outside the energy sector, is consistent with limiting the global temperature rise to 1.5 °C without a temperature overshoot (with a 50% probability). Universal access to sustainable energy is also achieved by 2030.

In terms of reporting, the One Earth Climate Model reports all GHG emissions separated in

- Scope 1, 2 and 3 emissions
- And for 10 industry sectors in line with the Global Industry Classification Standard (GICS)
- Data in regional breakdown: Global, OECD North America, OECD Europe (more regions are planned). The OECM provide absolute carbon emissions data as well as product level intensity data

The IEA Net Zero by 2050 covers

- all energy related and industrial process emissions but does not split between scope 1,2 and 3 emissions.
- does not specify all regions and industry sub-sectors and does not use the GICS categories.

As a result, a detailed quantitative comparison is not possible, however, key differences are outlined below.

Overview - Differences OECM vs IEA NZ2050

IEA Net Zero Scenario	*OECM – Energy pathway*
Aside from projects already committed as of 2021, no new oil or gas fields, or coal mines or mine extensions should be approved for development after 2021.	Existing oil and gas fields and coal mines are phased out at an average annual decrease rate of at least 8.5%, 3.5% and 9.5% respectively. New fossil fuel projects cannot go ahead.
Fossil fuel use falls from almost 80% of global energy supply in 2021 to just over 20% in 2050. CC(U)S is used after 2030 for coal, gas and bio energy fueled plants.	Fossil fuels will account for just under 8% of total energy supply in 2050 (for non-energy use only).
No new investment decisions should be taken for new unabated coal plants, the least efficient coal plants should be phased out by 2030, and by 2040 any remaining coal plants should be retrofitted with CCUS.	No new investment in fossil power plants after 2030, and coal power plants -including combined-heat and power (CHP)- will be phased out in Europe and North America between 2030 and 2035.

Emissions reductions through to 2030 rely on existing technologies, but by 2050, 46% of emissions reductions come from technologies that are currently at the demonstration or prototype phase.	Emissions reductions are almost completely driven by the shift to existing renewable energy technology, with some new technological development needed to assist the transition to electric vehicles, biofuels and hydrogen in the industry and transport sectors.
Carbon Capture, Utilization and Storage (CCUS) will capture 7,600 Mt CO2 per year by 2050. 5,245 Mt of this will be from fossil fuels and processes (including power, industry, and hydrogen production), 1,380 Mt from bioenergy (e.g., BECCS), and around 1,500 Mt will be from DACS technologies. IEA : approx. -120 Gt until 2050 (cumulative) no data for 2100.	BECCS and CCUS are both excluded from the analysis due to their lack of commercial viability. Reforestation begins immediately, and deforestation ends by 2030. Nature based carbon sinks (forests, mangroves and seaweed) are used instead of CCS to compensate for process emissions. OECM: - 5 Gt CO2 by 2050 / -86 Gt CO2 (cumulative until 2100)
Hydrogen production will be scaled up to be used as fuel in sectors such as shipping, air travel and heavy industry, with a total of 11 EJ/a produced by 2050.	7% of final energy use (2 EJ/a] will be supplied by renewable generated hydrogen, mainly for industrial process heat by 2050.
Electricity will account for almost 50% of total energy consumption in 2050, and total electricity generation will increase by 250% from 2021. IEA - Total global power generation in 2050: 72,000 TWh	Electricity will account for around 65% of total energy consumption in 2050. Electricity generation will increase by 206% until 2050, based on 2020 levels. OECM: Total power generation in 2050: 53,500 (2020: 26,700 TWh)
Almost 90% of global electricity generation in 2050 comes from renewable energy. Solar and wind account for 70%. Two thirds of *total energy supply* in 2050 is from renewables, with solar accounting for one fifth of total global energy supply.	100% of electricity generation will be from renewable energy. 100% of *total energy supply* will be from renewable energy, with solar accounting for one third of global energy supply. Any remaining fossil fuels will only be used for non-energy uses such as the petrochemicals industry.
Solar generation capacity is expected to increase 20-times between now and 2050, and wind capacity by 11 times.	Solar generation is expected to increase by 23 times between 2020 and 2050, and wind by 14.5 times.
Annual rate of energy intensity improvements of around 4% per year to 2030.	While the rate differs per region, this report assumes a comparable global average rate of energy intensity improvements to the IEA.
Total global final energy demand in 2050 is around 17% less than 2020.	Total global energy demand is 29% less than in 2020.
Bioenergy will be deployed for aviation, shipping, cooking, and replacing natural gas with biomethane to provide heat and electricity. Bioenergy will produce 102,000 PJ/a by 2050.	Sustainable biomass will produce 85,000 PJ/a in 2050. It will primarily be used for process heat and aviation.
The biggest innovation opportunities are in the areas of advanced battery storage, hydrogen electrolysis and direct air capture and storage (DACS).	No reliance on "break-through" technologies such as BECCS or DACS, but focused on technology that is already market ready, including technologies that may still evolve and fall in cost over time use to economies of scale.

The comparison between the OECM and the IEA models sectoral pathways between 2020 and 2050 is as follows **[THIS WILL NEED TO BE UPDATED WHEN OECM IS FINALIZED]:**

World Economic Forum Mission Possible Partnership (WEF MPP)

The Mission Possible Partnership is a coalition of public and private partners working on the industry transition to set heavy industry and mobility sectors on the pathway towards net-zero emissions by mid-century. MPP is comprised of four core partners – the Energy Transitions Commission, Rocky Mountain Institute, the We Mean Business coalition, and the World Economic Forum.

It focuses on developing partnerships to deliver key initiatives for enabling industries to achieve net-zero CO2 emissions, including aviation, circular cars, heavy-duty road transport, shipping, aluminum, chemicals, cement and concrete, and iron and steel.

[data/link will be included when it's available]

Sectoral Intelligence received from Sector Participants

To reality check the top down sector pathways, the Alliance will also employ a bottom up approach. This includes, but is not limited to:

- Sector dialogues: As companies converge around intensity-based or CO2 per production unit it is possible to begin to identify those who are 'on the mark' and those who fall short. Through sector dialogues, the "climate change sector leaders" will be used for reality checking the net-zero targets.58
- Gap Analysis: Transition Pathway Initiative (TPI) and other initiatives and data providers have collected targets for the high emitting sectors. This data will be used for a gap analysis where the selected high emitting sectors are today and will be compared to what science deems necessary to achieve net-zero pathways. The result will feed into sector, company and policy engagement.

- Reference to other sector pathways: Where sector pathways are not derived from an econo- my-wide model, but rather developed per sector, the Alliance will compare the individual sector pathways as well. For example, the Science Based Targets initiative has produced a 1.5°C pathway for the power sector. The results from these sector decarbonization pathways will be compared to the top down sector pathways 'corridor' derived from OECM, IEA, and WEF MPP.

Detailed information on High Emitting Sectors

[PLACEHOLDER FOR GRAPH SHOWING SCOPE 1& 2 OF HIGH EMITTING SECTORS]

Electric Utilities

The Utilities sector covers emissions associated with the energy, transport, operations and maintenance of power/heat generating equipment and associated transport infrastructure (energy grid and pipeline infrastructure).

Rationale for inclusion:

- One of the sectors with the most significant exposure to climate-related risks is utilities, as this sector lies at the core of the energy transition.
- Reliance on coal is one of the key transition risks for electric utilities. Uncertainty remains about when and at what pace the coal-fired plants will be phased out.

Way forward:

- Setting carbon emission reductions targets is a key area of engagement for investors with electric utilities.
- More transparency is needed on the retirement schedule of coal-fired plants (particularly on a national level) as the timing of this is important to understand the future financial impact on companies and the investments that will be needed to develop alternative generation sources.
- Speed of development of renewables and other low-emission energy sources sets the pace of the shift away from fossil fuels.
- Supported by a conducive regulatory and economic context, coupled with strong customer demand evidenced by growth in power purchase agreements (PPAs), hydro, nuclear, wind and solar PV will be significant sources of emission-free electricity.

Coal phase out

All Alliance targets should therefore be in line with IPCC Special Report on Global Warming of 1.5°C findings on coal. The Alliance has produced a Position Paper on Coal61 and target setting on utilities with reference to coal should conform with the guidance as indicated in the paper. The Alliance will allow for coal thresholds which are determined by either 'energy generated' or 'installed capacity'.

Examples of product/production targets

- t CO_2e/MWh
- mio. t CO_2/PJ

Oil & Gas

The oil and gas industry can be roughly broken down into three main segments: upstream, midstream and downstream. The Alliance sector metrics focus predominantly on upstream and downstream, as this is where the majority of emissions and mitigation actions are focused. Methane emissions resulting from fossil fuels mining and extractions are also be considered.

Upstream

- Upstream businesses are involved in exploring for oil and gas reservoirs, developing the sites and then extracting the fossil fuels

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51 One Earth Climate Model Sector Pathways to Net-Zero

52 IEA WEO 2020, Chapter 4.1, page 125

53 Participation in WEF Mission Possible and Rocky Mountain Institute sector dialogues have been identified as one such avenue.

54 unepfi.org/wordpress/wp-content/uploads/2020/11/Net-Zero-Asset-Owner-Alliance-Thermal-Coal-Posi-tion.pdf.

Midstream

Midstream businesses are responsible for moving extracted raw materials to refineries to process the oil and gas. They include shipping, trucking, pipelines, and storage operations.

Downstream

Downstream businesses refine raw materials into products for sale, converting oil and gas to products such as gasoline, heating oil, lubricants and plastics. All the supermajors are integrated, meaning they have both upstream and downstream assets.

Rationale for inclusion:

- The sector has a range of climate and environmental problems, not least because the fossil fuels it produces, and that the global economy is dependent on, are one of the main global sources of GHGs.
- Carbon emissions from oil and gas in existing fields and mines take the world beyond 1.5°C of warming and nearly exhaust a 2°C carbon budget.

Way forward:

- The sector itself must fundamentally transform if we are to achieve the goals of the Paris Agreement, with companies either winding down and returning value to shareholders or pivoting and driving the transition to a low carbon energy system.
- Oil and gas companies need exponential growth in environmental innovation.

Examples of intensity Targets

- Operational carbon intensity (scopes 1 & 2); mio.tCO_2e/PJ
- Portfolio carbon intensity (scopes 1,2 & 3); tCO_2e/TJ

Transport

The Transport Sector, under the Alliance Protocol, includes civil aviation, shipping and road trans- port. Civil aviation includes; passenger planes and airline services/airplane operation. Shipping includes; ships and shipping line services/ ship operation. Road transport includes; light and heavy- duty vehicles, car services/ car operations, and truck/bus services or operation.

Rationale for inclusion:

- Transport accounts for about a quarter of global energy-related carbon emissions. This contribution is rising faster than for any other energy end-use sector. Without aggressive and sustained policy intervention, direct transport carbon emissions could double by 2050.
- Emissions from aviation and shipping have recently been increasing at a faster rate than for any other transport mode. But energy demand and emissions have also continued to rise for all modes of road transport (cars, trucks, buses and two- and three-wheel vehicles).

Way forward:

- Transport sector is dependent on the ability of the *Energy* and *Utility* sector to provide sufficient amounts of renewable electricity, bio and synthetic fuels to supply airlines, shipping lines and road vehicles for passenger and freight transport.
- The key responsibility for the *Transport* sector is to move to electric vehicles, biofuels and renewable produced synthetic fuels.
- A rapid electrification of road transport fleets has crosscutting benefits for *Energy* and especially for the *Utility* sector as increased numbers of electric vehicles will come with higher storage capacities for electricity and significant demand side management possibilities to integrate high shares of variable solar and wind generation.

Examples of product/production targets

- g CO2/pkm
- MJ/pkm
- g CO2/tkm
- MJ/tkm

Materials

Steel

The Steel Sector covers steel manufacturing from mining to the product steel and doesn't take into account emissions from secondary steel products e.g. construction materials.

Rationale for inclusion:

- The global demand for steel continues to rise as economies grow, urbanise, consume more goods and build up their infrastructure. Steel is deeply engrained in our society.
- The steel sector is an important global greenhouse gas emitter from fossil fuel use and industry .
- Without targeted measures to reduce demand for steel where possible, and an overhaul of the current production fleet, CO2 emissions are projected to continue rising

Way forward:

- Through innovation, low-carbon technology deployment and resource efficiency, steel producers have a major opportunity to reduce energy consumption and greenhouse gas emissions, develop more sustainable products and enhance their competitiveness.
- Some companies are trying to make green hydrogen-based steel economically viable .

Examples of product/production targets

- tCO_2/ton steel

Cement

The Cement Sector covers the manufacturing of cement steel, this includes all activities required to produce cement; from mining limestone and clay to the final cement product. However, it doesn't include further processing of cement e.g. in the construction industry.

Rationale for inclusion:

- Cement is used to make concrete, the most consumed manufactured substance on the planet. Rising global population and urbanisation patterns, coupled with infrastructure development needs, drive up the demand for cement and concrete and increase pressure to accelerate action in reducing the carbon footprint of cement production.
- Availability of alternative cementing materials is also limited. So cement will continue to remain in demand. As a consequence, cement plants may not face an immediate stranded assets problem but they will have to confront with serious long term emissions challenges.

Way forward:

- Key strategies to cut carbon emissions in cement production include improving energy efficiency, switching to lower-carbon fuels, promoting material efficiency (to reduce the clinker-to-cement ratio and total demand) and advancing process and technology innovations.
- Optimising the use of concrete in construction by reducing waste, encouraging reuse and recycling, maximising design life and using concrete's properties to minimise operational energy of the built environment, are key strategies in this area.

Examples of product/production targets

- tCO_2/ton cement
- tCO_2/ton clinker (Clinker is a nodular material produced in the kilning stage during the production of cement and is used as the binder in many cement products.)

Aluminum

This sector covers the energy demand for the production of primary and secondary aluminum.

Rationale for inclusion:

- Demand for aluminum, an essential material for several key industries including construction, transportation and power transmission, is expected to grow significantly by 2050. As such, emissions must be addressed now.
- As a significant emitter, the aluminum sector needs to an action plan towards its pathway to decarbonisation. Now is the time to focus on finding solutions so it can play its part in meeting the international targets.

Way forward:

- The decarbonization of electricity consumption. The aluminum industry's power supply can be fundamentally addressed through the transition to renewable energy sources.
- The decarbonization of direct emissions from the processing of aluminum. The highest-impact pathways to decarbonize process emissions are transitioning to technologies that can provide heat and steam without the use of fossil fuels and the development of a non-carbon anode.
- The recycling of aluminum scrap, which requires just 5% of the energy needed to produce primary aluminum.

Examples of product/production targets

- tCO2/ton aluminium

Agriculture, Forestry and Fisheries

The agriculture sector covers agriculture and food including tobacco production. Forestry sector covers the energy demand for all wood and wooden products including pulp & paper and printing. Fisheries covers the energy demand for the fishing industry.

Rationale for inclusion:

- Agriculture, forestry, and fisheries must play a critical role in limiting the impact of climate as the sectors account for a large, growing and impactful share of global greenhouse gas emissions.
- A growing world population will result in a need for more food, including proportionally more protein and, it follows, increased agriculture emissions.

Way forward:

- Reducing agriculture emissions will require changing how we farm, what we eat, how much we waste, and how we manage our forests and natural carbon sinks.
- Efforts can involve expanding adoption of technologies or agriculture practices that can reduce emissions while maintaining food production levels.
- Efforts can involve reducing deforestation and delivering reforestation, afforestation, and other natural sinks.

Examples of product/production targets

- Activity parameter – MJ/$GDP

Chemicals:

Chemicals sector in our review is divided into the following sub-sectors;

1. Pharmaceuticals
2. Agricultural chemicals
3. Specialties, inorganic chemicals, consumer products
4. Manufactured fibers, synthetics rubber
5. Bulk petrochemicals & intermediates, plastic resins

Rationale for inclusion:

- The chemicals sector is the largest industrial energy consumer and is a key contributor of direct CO_2 emissions.
- The sector's substantial energy consumption is propelled by demand for a vast array of chemical products. Demand for primary chemicals– which is an indication of activity in the sector overall – has increased strongly in recent years and is expected to grow.

Way forward:

- Increased energy efficiency – through both incremental improvements to existing methods and step changes resulting from switching to fundamentally more efficient methods (e.g. from coal- to natural gas-based processing)
- Improved recycling has multiple benefits, including reducing the need for virgin production, reducing downcycling (in which a material is recycled into a lower-value end use), and reducing plastic waste.

Examples of product/production targets

- Activity parameter – MJ/$GDP

Construction and Buildings:

This sector covers the electricity, heating and climatization energy demand for residential and commercial buildings.

Rationale for inclusion:

- The building and construction sector plays a central role in the shift towards a low-carbon economy as the sector's greenhouse gas emissions account for a significant proportion of global greenhouse gas emissions.
- The major contributors to these emissions are the materials used as well as the heating, cooling, and lighting of buildings and infrastructure.

Way forward:

- Approaches such as maximising the use of existing assets, promoting renovation instead of demolition and seeking new circular business models that reduce reliance on carbon intensive raw materials are needed.

Examples of product/production targets

- CO2/m2
- kWh/m2 a

Water Utilities:

This sector covers the energy demand for water utilities.

Rationale for inclusion:

- Water utilities are a source of global carbon emissions from energy consumption, as well as process emissions from nitrous oxides and methane emissions in wastewater systems. Therefore, it can contribute its share to meeting the international targets.
- A large amount of energy is expended to supply, treat and use water, meaning that water-oriented strategies can result in significant reductions in energy use and greenhouse gas emissions.

Way forward:

- The largest proportion of the water industry's carbon dioxide equivalent (CO2e) emissions is attributed to energy use. Therefore, decarbonisation of the energy industry is essential to enable the water industry to meet its target for reduction of emissions.
- New technologies for treatment and processing of 'waste' streams are suggested, which would recover heat and valuable raw materials for agriculture and manufacturing, further reducing carbon use.

Examples of product/production targets

- kWh/m3

Textile and Leather:

This sector covers the energy demand for the textile and leather industry.

Rationale for inclusion:

- It is one of the major polluting sectors of the world. From fiber production to consumer use phase, the industry releases huge amount of carbon.

Way forward:

- Several full life-cycle assessments of garments and other textiles have been undertaken, and they demonstrate that attention must be paid at every stage of the supply chain, to reduce the total environmental load. This includes how fiber is grown or synthesized, how fabric is spun, treated and dyed, how the garments are constructed and delivered and then how they are used, washed and finally disposed of. Everyone, from farmers to manufacturers, to designers and consumers can contribute to change .

Examples of product/production targets

- Activity parameter – MJ/$GDP

Consultation Questions

- Do you agree with the 3-step approach for setting sector targets as proposed? Y/N-Comment
- Are you aware of any additional sectoral models which should be included? (an open comment field)
- Do you have any additional comments on the newly added sectors or their measurement metrics? (an open comment field)

The general public is invited to submit input via the https://forms.office.com/r/9RGpdeN41q.

[Revised changes highlighted] 1.6 Climate Action 100+ to be moved to Engagement Chapter

Climate Action 100+ is an important initiative on collaborative investor engagement with investee companies . Climate Action 100+ (CA100+) launched in December 2017. Delivered through five partner organisations PRI, AIGCC, IGCC, IIGCC, and CERES, CA100+ is an investor initiative aiming to ensure the world's largest corporate greenhouse gas emitters take necessary action on climate change. Over 500 investors with over $52 trillion in AUM are engaging 160+16 companies to request the companies to: reduce emissions in line with Paris Agreement targets; improve governance and strengthen climate-related financial disclosures in line with TCFD recommendations. The target companies include 100 'systemically important emitters', accounting for two-thirds of annual global industrial GHG emissions, alongside more than 60 others with significant opportunity to drive the clean energy transition. Many Alliance members are also signatories to CA100+ to support the net-zero focus, collaborate on sector specific decarbonisation pathways, and support collective investor action. Collaborative engagement enhances investor influence,17 builds expertise, and improves efficiency of the engagement process by sharing the workload, so the Alliance encourages all its members join the CA100+ group.

Since the first Protocol was published in January 2020, CA100+ released "Climate Action 100+ Net-Zero Company Benchmarks", which is one of several frameworks to assess focus companies based on their publicly disclosed information. The Alliance welcomes this development and therefore has also checked its own approaches against it.

Leading by Example

In an effort to ensure that the Alliance members ask of themselves what they ask of others, the Alliance has compared the ten indicators of the CA100+ benchmark framework to this Protocol.

	Indicators of the CA100+ Benchmark Framework
1	Net-zero GHG emissions by 2050 or sooner ambition
2	Long-term (2036-2050) GHG reduction target(s)
3	Medium-term (2026-2035) GHG reduction target(s)
4	Short-term (up to 2025) GHG reduction target(s)
5	Decarbonisation strategy
6	Capital allocation alignment
7	Climate policy engagement
8	Climate Governance
	Just Transition
10	TCFD Disclosure

However, it should be stated that a financial institution is different from a real economy corporate in that some elements for example the Indicator 6 Capital allocation alignment is less relevant in business model transition. This considered, we have found four areas where the Alliance would clarify its members approach further (highlighted in dark blue in table XXX):

Indicator 2 and 3 - Long-term (2036-2050) and medium-term (2026-2035) GHG reduction target(s)

We recognise that setting medium and long-term targets play an important role in achieving the net-zero 2050 target. By committing to set short-term targets and a long-term target of net-zero emissions by 2050 line with the IPCC no/low overshoot scenarios, the Alliance believes members are meeting aligned investment portfolios with a 1.5°C decarbonisation trajectory. As portfolio medium-term targets directly depend on the decarbonization speed of investee companies asset owner need to have a constant feedback loop from true real world decarbonization into their medium-term target setting. Otherwise target setting might lead to forced divestments from transition sectors. This is fundamentally different to Scope 1 and 2 emissions of real world companies where the level of control is substantial higher. Members having i)

set a long term 2050 target, ii) set a short term target to support immediate steering, and iii) have agreed to align with no/low overshoot pathways, their mid-term targets are then implicit.

Indicator 7 - Climate policy engagement

The members of the Alliance commit to align all lobbying activities with the goal of the Paris Agreement. This includes a review of all associations and organisations the Alliance members hold membership. In order to be transparent members should strive to disclose all lobbying activities and memberships in associations and organisations, and member should consider taking an advocacy position or ceasing membership in organisations which do not align their advocacy with the Paris Agreement.

There may be however, certain situations for financial institutions which do not apply to companies being evaluated by the CA100+ benchmark, for example sovereign wealth funds are legally advised to avoid political positions or lobbying activities and therefore, would not disclose any position or hold memberships. The same may apply to some (re)insurance activities. Additionally, in a first instance members may try to persuade organizations to become Paris-aligned, before considering cessation of membership. Further, and importantly, Alliance members are encouraged to review the lobbying activities of their investee companies to gauge level of Paris-alignment.

Indicator 10 – TCFD Disclosure

The members of the Alliance are strongly recommended to commit to following TCFD recommendations on governance, strategy, risk management and measurement in their own business operations and reporting and issuing TCFD disclosures.

Consultation Questions

- Do you agree with the proposed guidance on applying the corporate CA100+ benchmark principles to investors? Y/N-Comment
- Do you have any other suggestions (an open comment field)

The general public is invited to submit input via the https://forms.office.com/r/9RGpdeN41q.