

Report of the EGTI Subgroup on National Greenhouse Gas Emission Monitoring Indicators for the ICT Sector

August 2026

1. Context and objectives

The environmental impacts of digital infrastructure are increasingly relevant to national climate, energy and digital policy. However, unlike sectors with long-established statistical and emissions-accounting systems, national information on greenhouse gas (GHG) emissions and energy use from the information and communication technology (ICT) sector remains fragmented. Data may be held by companies, telecommunications regulators, environmental authorities, statistical offices or energy agencies, and is often prepared for different purposes and using different reporting boundaries.

To address this gap, the ITU's Expert Group on Telecommunication/ICT Indicators (EGTI) established, following its 15th meeting in September 2024, a Subgroup on National Greenhouse Gas Emission Monitoring Indicators for the ICT Sector, tasked with defining harmonized environmental indicators to support national-level monitoring of the sector's environmental impact. The Subgroup's framework covers greenhouse gas emissions (Scopes 1, 2 and 3), energy and electricity consumption, and renewable energy use across three principal ICT subsectors: telecommunications networks, data centres, and end-user devices. Within these components, it identifies four main categories of actors: telecommunications operators, data centre operators, network equipment manufacturers and end-user device manufacturers. The framework includes both indicators common to all actors and indicators specific to each activity. Each indicator is assigned two priority scores, reflecting its environmental relevance and data accessibility, to support the identification of indicators that are both important and feasible to collect at national level. The [indicator framework](#) was validated through expert discussion and cross-referenced against existing models, including those of BEREC, the French regulator Arcep, and ITU-T Study Group 5 (Recommendation L.1472), and was presented at the 16th EGTI meeting in Geneva on 25 September 2025.

Building on the Subgroup's own recommendation to "develop a dedicated questionnaire based on the indicators outlined ... and launch pilot data collection ... in volunteer countries," the 2025-2026 work cycle focused on a pilot implementation exercise to test the framework's operational feasibility. The pilot pursued four objectives:

1. Validate the EGTI indicator framework at the national level in subgroup member countries, by coordinating data collection through a standardized questionnaire in collaboration with relevant national stakeholders.
2. Assess data availability and collection feasibility separately for each of the three ICT sub-sectors: telecom networks, data centres, and end-user device manufacturers.
3. Identify data gaps and the institutional, regulatory, and methodological challenges affecting national-level monitoring.
4. Generate country-level evidence to refine the Subgroup's indicator list, priority scores, and selection thresholds.
5. Provides a foundation for considering how harmonized national ICT environmental indicators could, in future, be reported to and disseminated by ITU.

During the 2025-2026 work cycle, the subgroup met five times as a group and held numerous bilateral consultations with participating administrations, regulators, technical experts and pilot countries. ITU also

developed questionnaires to support collection of the indicators outlined in the subgroup framework. The questionnaires were tested through country pilots and compared with the experience of ITU-T Study Group 5, including the pilot associated with Recommendation ITU-T L.1472.

The Subgroup confirmed that national monitoring of ICT-sector emissions and energy use is feasible, provided that implementation starts with a limited set of priority indicators, focuses initially on telecommunications operators, and is supported by appropriate governance, methodological guidance and confidentiality safeguards.

This report presents a global implementation approach informed by the experience of participating members and experts. The country examples are used to illustrate practical lessons; they are not intended to imply that a single institutional model will work in all national contexts.

2. Membership and work completed

The subgroup brought together representatives of national administrations and regulators from all ITU regions, as well as ITU-D, ITU-T, international organizations, research institutions and private-sector experts. Countries represented in the 2026 work included:

- Africa: Comoros, South Africa, Tanzania, Togo, Uganda and Zambia;
- Arab States: Egypt;
- Asia and the Pacific: Malaysia, the Philippines and Vanuatu;
- CIS: Azerbaijan;
- Europe: Czech Republic, France, Greece, Norway, Portugal, BEREC;
- Americas: Brazil and the British Virgin Islands.

Contributions were also received from ITU staff and experts, including ITU-T Study Group 5, the OECD, the World Bank, the research community and the private sector. The subgroup was chaired by Ms. Loïs Ponce of Arcep, France.

The 2026 programme of work combined five group wide meetings, in addition to targeted individual country consultations. The main activities were:

- reviewing and testing the detailed questionnaires developed from the 2025 indicator framework;
- developing a simplified priority questionnaire for initial national implementation;
- supporting pilot implementation and stakeholder engagement in participating countries;
- reviewing available company sustainability, environmental and annual reports as potential data sources;
- examining institutional, methodological and confidentiality barriers;
- learning from the ITU-T L.1472 database pilot and from emerging national digital-footprint initiatives; and
- identifying the methodological guidance and capacity-building support required for wider implementation.

2.1 Outputs delivered during the 2025-2026 work cycle

The work cycle produced the following concrete outputs:

- a revised priority questionnaire for initial national implementation;
- a retained full indicator framework serving as a longer-term methodological reference;
- country engagement and pilot evidence covering different stages of readiness;
- a proposed phased implementation model, beginning with telecommunications operators;
- a consolidated set of implementation barriers, data-quality requirements and suggested metadata;

3. From a comprehensive framework to a practical starting point

3.1 The full indicator framework as a long-term “wish list”

The full questionnaire translates the 2025 indicator framework into a detailed data collection instrument covering the four categories of actors identified within the four main ICT components: telecommunications operators, data centre operators, network equipment manufacturers and end-user device manufacturers. It includes corporate GHG emissions, Scope 3 categories, energy and renewable energy breakdowns, network technology breakdowns, plant- and site-level information, water use, materials, equipment use and contextual information.

The full list is valuable as a statement of information that could ultimately support a comprehensive national assessment. It should therefore be retained as a long-term “wish list” and a reference for countries with advanced reporting systems. It should not, however, be interpreted as a minimum reporting requirement for all countries. Pilot experience shows that requesting the entire list at the outset would create an excessive burden, generate large gaps, and risk discouraging participation.

Several detailed indicators are environmentally relevant but are not yet routinely available at national level. Examples include Scope 3 category-level emissions; energy consumption broken down by fixed and mobile technology; electricity used by customer equipment; data-centre electricity and water use by site; plant-level manufacturing data; and quantities of precious metals and rare earth elements. Some data may also raise confidentiality concerns for individual operators or be difficult to aggregate without double counting, particularly Scope 3 emissions. In some cases, operators may be reluctant to disclose data they consider commercially sensitive or have not yet made public through their own reporting. These concerns can be mitigated by aggregating data at the country level without publishing individual operator figures. Timing can also affect disclosure: for example, where the most recent reporting-year data have not yet been publicly released, operators may prefer to wait until their own corporate reporting cycle is complete.

3.2 The revised priority questionnaire

To provide a realistic entry point, the Subgroup prepared a simplified priority questionnaire based on the two priority scores developed in the 2025 indicator framework: environmental relevance and data accessibility. The revised questionnaire was further informed by expert discussion and practical evidence from the 2025-2026 country engagement and it focuses on indicators that are both important for environmental monitoring and more commonly available. It asked for annual data (2024 and 2025) and is organized by four respondent groups: telecommunications operators, data centre operators, end-user device manufacturers and network-equipment manufacturers. Based on the pilot experience, it is recommended that specific Scope 3 categories are included in the priority questionnaire to capture as much emissions as possible.

Table 1. Indicators included in the revised priority questionnaire

Respondent group	Indicator	Unit
All respondent groups	Scope 1 GHG emissions	tCO ₂ e
All respondent groups	Scope 2 GHG emissions (location-based)	tCO ₂ e
All respondent groups	Scope 2 GHG emissions (market-based)	tCO ₂ e
All respondent groups	Total energy consumption	MWh
All respondent groups	Total electricity consumption	MWh
All respondent groups	Total renewable electricity consumption	MWh
Telecommunications operators	Total energy consumption of telecom networks	MWh

Respondent group	Indicator	Unit
Telecommunications operators	Scope 3 Category 8 Upstream leased assets Scope 3 Category 13 Downstream leased assets	tCO ₂ e
Data centre operators	Number of data centres	Number
Data centre operators	Power load of data centres	MW
Data centre operators	Power Usage Effectiveness (PUE)	Ratio
Data centre operators	Total energy consumption of data centres	MWh
Data centre operators	Total energy consumption of IT equipment	MWh
Data centre operators	Scope 3 Category 8 Upstream leased assets Scope 3 Category 13 Downstream leased assets	tCO ₂ e
End-user device manufacturers	Total energy consumption of plants for the manufacture of end-user devices	MWh
Network equipment manufactures	Total energy consumption of equipment manufacturing plants	MWh

The priority list is intended to establish a common core, not a ceiling. Countries may add indicators where data are available and national policy needs justify collection. Network equipment manufacturers remain within the full framework but are not included in the revised priority questionnaire because national production data were generally less feasible to identify and collect during pilot work. Market-based Scope 2 emissions should be collected only alongside location-based Scope 2 emissions, and may not be relevant where contractual renewable-electricity instruments do not exist. Note that certain Scope 3 categories are highly relevant for telecommunications operators and data centre operators as they identify the emissions attribution to tower companies and data centre customers. Independent tower companies are not proposed as a separate respondent category in the initial priority questionnaire. Where relevant, however, countries should identify tower companies during stakeholder mapping and determine whether energy use and emissions associated with tower infrastructure are reported by the telecommunications operator, the tower company or another entity. The reporting boundary should be documented, and the same energy use or emissions should not be counted more than once. Countries with significant independent tower-company markets may collect supplementary information directly from these companies where necessary to obtain representative national estimates.

As the purpose of the data collection is obtaining country-level indicators, for international comparison, absolute national totals should be accompanied by relevant contextual indicators, including the market coverage represented by the reporting entities. Further work is required to determine appropriate normalization metrics for cross-country comparison. Potential denominators may include subscribers, data traffic, population, economic output or other subsector-specific measures; however, no single denominator is appropriate for all indicators or ICT subsectors. Such intensity indicators should therefore be developed and tested as part of the methodological guidance.

3.3 Comparison of the two versions

Table 2. Full questionnaire and revised priority questionnaire

Dimension	Full version	Revised priority version
Purpose	Comprehensive long-term framework and methodological reference	Feasible starting point for pilot and recurring collection
Coverage	Four stakeholder groups, detailed subsector and site/plant-level data	Four principal stakeholder groups and a limited common core
GHG emissions	Scopes 1, 2 and 3, including selected Scope 3 categories	Scope 1 and Scope 2, plus selected Scope 3 categories relating to leased assets for telecommunications and data centre operators
Energy	Total, electricity, renewable/low-carbon energy and source breakdowns	Total energy, electricity and renewable electricity
Telecom detail	Fixed/mobile and technology-level breakdowns; customer equipment	Total telecom-network energy only
Data centres	Site details, PUE, energy, IT electricity, water and location	Number, power load, data-centre energy and IT equipment energy
Manufacturing	Plant details, energy, water and material use and location	Plant energy consumption only
Implementation expectation	Progressive, depending on national systems and data availability	Recommended minimum starting set

4. Proposed global implementation approach

The pilot results support a phased global approach that preserves a common core while allowing countries to adapt implementation to their institutional arrangements and data availability. A harmonized framework requires common definitions, transparent boundaries, documented sources and a clear pathway for improving coverage and quality of indicators over time.

4.1 Phase 1: establish governance and begin with telecommunications

Telecommunications operators are the most practical starting point in most countries. Regulators already identify licensed operators, collect market statistics and can select companies representing a high share of national subscribers or turnover. Many major operators already calculate Scope 1, Scope 2, electricity, fuel and renewable-electricity indicators for sustainability reporting. Starting with telecommunications allows national institutions to build experience before extending collection to data centres and manufacturing.

The lead institution will vary. In some countries the telecommunications regulator can initiate collection under an existing statistical mandate. In others, environmental or statistical authorities hold the relevant legal powers. Countries should designate a stable focal point and establish coordination among telecommunications, environmental, energy and statistical authorities before recurring collection begins.

4.2 Phase 2: expand coverage and improve data quality

As countries strengthen the collection of priority indicators, they can gradually expand coverage to include additional indicators, such as more detailed telecommunications network metrics, data-centre indicators, information from device manufacturers, renewable-energy source breakdowns, Scope 3 emissions and resource-use metrics. Engagement with relevant stakeholders on these additional indicators can begin before the collection of the priority set is fully stabilised, helping to improve data availability and progressively build reporting capacity.

The pace and scope of expansion should reflect the capacity of data-collecting entities, the readiness of reporting entities, demonstrated policy value, environmental assessment needs, data availability and safeguards for confidential information. Countries should not be expected to collect every indicator in the annex immediately or to follow a strictly sequential approach.

5. Country pilot implementation and data collection status

The 2026 pilots covered 13 countries at different stages of readiness, through a four-step process: identification of national focal points, distribution of the questionnaire, data compilation and validation, and bilateral technical discussions (Table 3). The level of participation was not uniform: it included completed or advanced pilots, data-submission exercises, ongoing pilots, preparatory engagement and institutional consultations. Progress should therefore be assessed in terms of establishing a workable national process, obtaining data from participating companies together with the necessary contextual and methodological information to interpret and validate these data, and achieving representative market coverage. A country exercise can successfully test an implementation process without yet producing a complete national ICT-sector estimate.

Across this group, telecommunications operators proved the most mature reporting segment, generally able to provide energy and electricity consumption, Scope 1 and Scope 2 emissions, and renewable electricity use. However, reporting units and emissions methodologies were not fully harmonized and it was often difficult to distinguish energy consumption of telecom operators from that of independent tower companies. Data centres, by contrast, largely fall outside traditional telecom regulatory structures, requiring cooperation with additional institutions or private operators, while end-user device manufacturers showed the lowest feasibility, as this sub-sector can only be meaningfully surveyed in countries where manufacturing plants are physically located.

Institutional fragmentation emerged as a recurring barrier: environmental reporting responsibilities are distributed across the Ministry of Communications and the Ministry of Environment, each applying different indicators and cycles, while some noted that relevant information is primarily held by environmental institutions rather than the telecommunications regulator. Regulatory mandate also proved a key determinant of implementation capacity: e.g. in some countries, operators report on a voluntary basis with no dedicated legal framework, and some regulators have limited mandate for environmental data collection.

Anatel, Brazil conducted a more in-depth pilot. Following a public webinar, formal letters and bilateral outreach, 49 companies were shortlisted and 15 submitted data, representing a 31 per cent response rate. Telecommunications operators achieved the target of at least 80 per cent market coverage, while coverage remained lower for data centres, tower companies and equipment manufacturers. Among participating companies, 87 per cent reported Scope 1 emissions, 93 per cent Scope 2 and 73 per cent Scope 3. The pilot confirmed that regulator-led collection is feasible but highlighted the importance of legal mandates, clear sector boundaries, standardized units and definitions, safeguards for confidential information and sustained technical support. Companies generally understood high-level emissions indicators but found detailed breakdowns by infrastructure, equipment or network technology difficult to provide. Shared infrastructure, inconsistent reporting boundaries and the timing of data requests alongside companies' own disclosure cycles also created challenges. Brazil recommended a phased implementation model, early stakeholder mapping, differentiated outreach by subsector and closer alignment with company reporting calendars.

Norway is testing a complementary approach through Nkom's Digitalisation for Sustainability Index. The initiative combines operator data with lifecycle-based intensity factors in a digital, quality-graded data architecture. Nkom welcomed the EGTI questionnaire but emphasized the need for clearer calculation methodologies, particularly for Scope 3, as different methods can produce substantially different results. Nkom also recommended transparent reporting of data sources, methods and quality levels rather than assuming immediate comparability between countries. It highlighted the need to prevent double counting, connect future data collection to existing reporting systems and distinguish between direct national reporting and the use of global intensity factors for equipment manufactured abroad. Its modular approach may also

support future expansion beyond emissions and energy to areas such as water, materials, e-waste and biodiversity.

MCMC Malaysia conducted the pilot within the development of the MCMC Sustainability Framework and Roadmap 2030 (SFR2030), aligned with Malaysia's national sustainability reporting direction under the Securities Commission Malaysia-led National Sustainability Reporting Framework (NSRF). This enabled economy-wide requirements to be translated into a proportionate, sector-specific approach. The process involved 47 organisations and 116 participants through 16 interviews and four roundtables, reflecting strong industry interest in more consistent sustainability measurement. Supported by MCMC-sponsored research and public disclosures, MCMC shared aggregated 2024 and 2025 data for five major telecommunications operators, representing approximately 95 per cent of the market. The pilot showed that high sector coverage can be achieved by leveraging existing reporting systems, industry data and national policy direction without creating a parallel reporting layer. It also identified areas requiring further harmonisation, particularly Scope 3, reporting boundaries, subsector-specific indicators, data-centre data gaps and tower energy attribution. MCMC welcomes the EGTI initiative as an important mechanism for advancing internationally consistent sector measurement. Beyond emissions and energy, Malaysia is already expanding measurement to renewable energy uptake, circularity and resource-efficiency indicators.

The findings should be interpreted in light of several limitations. Only a subset of participating countries completed or substantially advanced data collection during the work cycle. The exercises were heterogeneous in scope, respondent coverage and institutional setting and participation was often voluntary. Moreover, quantitative results were not available in a standardised form for all countries. The evidence is therefore strongest for the feasibility of initiating collection from major telecommunications operators and less conclusive for complete national coverage of data centers and manufacturing.

The pilots also covered a short reporting period and did not yet establish sufficiently long or consistent time series for trend analysis. Differences in fiscal years, assurance status, organizational boundaries, national allocation methods and treatment of shared infrastructure further limit direct comparison across countries. These constraints should be addressed in future pilot cycles and in the proposed methodological guidance.

Table 3. Status of country engagement and collection during the 2026 work cycle

Country	Status	Main observation
Brazil	Pilot implemented	A regulator-led voluntary pilot tested the full indicator framework across a large and diverse ICT market of 49 companies. It demonstrated operational feasibility, but data coverage and confidentiality varied by subsector. A detailed case study is being produced and will be launched by ITU and Anatel in 2026.
Malaysia	Data received	Aggregated 2024 and 2025 data were submitted for five major telecom operators, representing approximately 95% of the market. The pilot leveraged Malaysia's existing national reporting architecture and sector-level engagements, demonstrating representative data collection without creating a parallel reporting layer.
Azerbaijan	Data received	Information was submitted for three telecom operators.
Greece	Existing national study shared	The regulator shared results from an earlier national study, providing evidence on feasible data sources and national collection.
South Africa	Pilot ongoing; initial data shared	Several consultations were held and data collection is being prepared; questionnaire shared with stakeholders.

Country	Status	Main observation
Norway	Digital-first pilot under development	The D4S Beta project is developing a data matrix and software tool structured around segments, themes, indicators, data sources and quality levels.
Egypt	Data preparation	Responsibilities are divided across several institutions, illustrating the need for inter-agency coordination.
Tanzania	Pilot ongoing; data pending	Several consultations were held and data collection is being prepared; questionnaire shared with stakeholders.
Comoros	Data pending	A consultation was held and national follow-up was under way.
Zambia	Data pending	A consultation and country briefing were held; data collection was being prepared.
Portugal	Public information and substantive response received	Publicly available information for major telecommunications operators and group-level cell tower company data provided, together with institutional and methodological feedback.
Czech Republic	Institutional barrier	The telecom regulator indicated that the relevant information is held by environmental authorities.
Philippines	Pilot ongoing; initial data received	Consultations were held and data collection is being prepared; questionnaires shared with stakeholders.

6. What data sources work

6.1 Company sustainability and environmental reports

Public company sustainability and environmental reports can be an efficient source for pre-populating the priority questionnaire where such reporting exists. Scope 1 and Scope 2 emissions, total energy, electricity and renewable electricity are widely disclosed by larger companies. Regulators can identify in-scope operators, extract available national or subsidiary-level data and ask companies to confirm or complete the information. This approach reduces respondent burden and allows follow-up to focus on gaps and inconsistencies.

Public reporting nevertheless has limitations. Many multinational companies publish only global totals. Country-specific values may be absent, use a different fiscal year, or combine activities that do not align with the national ICT-sector boundary. Allocation based on revenue or turnover can provide an estimate where direct country data are unavailable, but any allocation method must be clearly documented and should not be treated as equivalent to directly measured national data. In markets where operators do not publish sufficiently detailed information, including smaller or state-owned operators, direct data requests may instead be the primary collection method. The appropriate approach should therefore depend on the availability and quality of existing information.

Pre-population can be particularly useful in contexts where regulators or other collecting entities do not have a mandatory data collection mandate, as it demonstrates active engagement with companies and can facilitate their participation by reducing the effort required from respondents.

However, caution is needed regarding the quality and traceability of the information used for pre-population. Company sustainability reports may not always provide sufficient detail on the methodologies, boundaries or assumptions underlying reported figures. Once the questionnaire has been pre-populated, companies should verify the information provided and confirm, clarify or document the methodologies applied. If company responses remain incomplete, insufficiently documented or too high-level, the collecting entity may not have the information needed to validate the reported data. A further consideration is that pre-population may create

a risk of implicit validation: companies may be less likely to challenge or review information that has already been entered by the collecting entity, assuming that the values have been independently verified or considered reliable.

The responsibility associated with pre-populated data should also be considered: when the entity responsible for data collection directly completes part of the questionnaire, it may be held partially responsible for the accuracy of the information. However, this is mitigated by the fact that it is based on a published report of the company.

6.2 Existing regulatory and statistical reporting

In addition to publicly available company sustainability reports, existing regulatory and official statistical data sources can support several stages of the data collection process. Existing telecommunications market reports are useful for identifying operators and calculating market coverage. Environmental authorities, statistical offices and energy agencies may already collect emissions, fuel or electricity information. Reusing these sources can reduce duplication, but data-sharing arrangements and common identifiers may be needed to link records across institutions.

6.3 Direct company questionnaires and bilateral follow-up

Questionnaires addressed directly to companies remain necessary to collect indicators that are not public, verify or complete pre-populated information, confirm reporting boundaries and obtain contextual information, explanations of changes and details on the methodologies applied. Bilateral engagement proved important in the pilots, particularly where companies needed clarification on units, organizational boundaries, national allocation or treatment of leased infrastructure. Bilateral exchanges are also beneficial for collecting entities, in particular, they provide a better understanding of companies' reporting practices, methodological choices, and data limitations. A questionnaire should therefore be accompanied by guidance, a named focal point and a structured validation process.

7. Proposed data collection methodology

7.1. Stage 1: company- or reporting-entity-level data collection

National ICT environmental indicators are produced through two distinct stages. The first is the collection and validation of information from individual reporting entities; the second is the aggregation of sufficiently comparable and representative information into national indicators. Distinguishing these stages is important because requirements relating to confidentiality, representativeness, and publication differ between company-level data and national aggregates. Telecommunications operators should be the first implementation priority in countries where the telecommunications regulator already compiles sector statistics. At the same time, countries should establish mechanisms for continued knowledge exchange among regulators, relevant government institutions and industry to share practical experience, methodologies and lessons learned from implementation. This can help countries progressively expand monitoring beyond telecommunications to more challenging subsectors, particularly data centres, where institutional responsibilities, market visibility and data availability remain less developed.

A practical collection sequence is:

1. Define the relevant ICT subsector and identify the reporting population.
2. Select reporting entities, initially prioritizing facilities-based telecommunications operators and select companies that collectively represent at least 80% of the national market, using subscribers or turnover as appropriate.
3. Use existing public, regulatory or statistical information to pre-populate the questionnaire where suitable, or request the information directly where public information is unavailable.
4. Contact each selected operator, identify the appropriate reporting focal point, explain the objectives and process of the data collection, and provide the data collection questionnaire.

5. Confirm the organizational and geographic boundary with each operator, including whether tower infrastructure, data centres and leased assets are included.
6. Collect the priority indicators together with the associated metadata, including source, reference year, methodology, boundary and data-quality status.
7. Validate completeness, units, methodologies and consistency with reporting entities and resolve significant discrepancies before aggregation.

Particular attention is needed where mobile operators have transferred tower assets to tower companies. Depending on operational control and contractual arrangements, the associated fuel, electricity and emissions may be reported by the telecom operator, the tower company, or both. Countries should document the treatment used and avoid double counting.

The pilots indicate that Scope 1, Scope 2, electricity consumption, fuel consumption and renewable electricity are generally the most feasible indicators. Network-energy data may also be available, but detailed splits between fixed and mobile networks, or between 2G, 3G, 4G and 5G, are less consistently measured and may be difficult where infrastructure is shared. Confidentiality is a central implementation issue, especially for data centres, manufacturing plants, energy use by asset type and markets with only one or two major companies.

The ITU-T L.1472 pilot reached a similar conclusion. Companies were generally able to identify many GHG and electricity data points, but were less willing or able to share detailed server, network-equipment, storage, plant and site information. Participants emphasized the need to avoid duplicate reporting, align with existing disclosures and consider non-public or aggregated approaches for sensitive data.

A proportionate approach should be distinguished among:

- public data that can be pre-populated and published;
- non-public data that may be collected and used for statistical purposes subject to appropriate confidentiality safeguards and aggregation; and
- information that is not currently measured and should remain part of the long-term indicator wish list rather than an immediate requirement.

7.2. Stage 1: country level aggregation

In the second stage, the collecting entity should determine whether individual observations are sufficiently comparable and representative to support a national aggregate. Data should be aggregated where reporting boundaries, definitions and units have been aligned or differences can be appropriately documented.

For each aggregate, countries should report the share of the relevant national market represented by the reporting entities and the measure used to calculate coverage, such as subscribers, revenue or another appropriate sector measure. Where coverage is insufficient to support a representative national figure, the result should be reported as a partial-sector estimate rather than a national total.

Confidentiality should be assessed separately at this stage. Individual confidential observations may contribute to national statistics provided appropriate statistical confidentiality safeguards are applied and publication does not permit individual respondents to be identified. Before publication, countries should define operational disclosure rules, including minimum aggregation thresholds, treatment of dominant firms and markets with few respondents, access restrictions, review by reporting entities, and whether values may be published only as indices, ranges or trends. Collection, analytical use and publication should be treated as separate decisions.

No universal numerical disclosure threshold is proposed at this stage, as confidentiality rules and market structures differ across countries. Collecting entities should apply their national statistical confidentiality rules when available. At a minimum, publication should be suppressed, further aggregated or presented as a range, index or trend where an individual reporting entity could reasonably be identified from the published aggregate, including in highly concentrated markets. Further methodological work should examine whether common minimum disclosure criteria would support international consistency.

8. Methodological issues requiring further guidance

8.1 National and organizational boundaries

The framework requires clearer guidance on which activities belong within each ICT subsector and how to treat shared infrastructure, subsidiaries, outsourced operations, tower companies, cloud services and data centres owned by telecom operators.

8.2 National allocation

Where companies report global or regional data, national estimates may be allocated using revenue, subscribers, traffic, floor area, installed IT power or another relevant driver. Direct national data should be preferred. Revenue or turnover allocation should be treated as a proxy of last resort because economic activity may not reflect the location or intensity of energy use and emissions. Any estimates should be clearly labelled, document the rationale for the selected driver, retain the original reported value, and include an assessment of uncertainty where feasible.

The most appropriate allocation driver depends on the activity represented by the indicator and should, as far as possible, reflect the physical source of the emissions or energy consumption. For example, facility-level energy should be allocated according to the location and activity of the relevant facilities wherever such information exists, rather than by company revenue. Traffic, subscribers, installed capacity, floor area or other activity measures may provide more suitable proxies for particular activities. The selected driver should be justified and consistently applied. Further pilot work is required before recommending standardized allocation drivers for individual indicators.

8.3 Scope 3 and double counting

Scope 3 emissions are typically the greatest for many digital companies and should be collected where data is available and methods are sufficiently documented. However, Scope 3 values should be presented separately and should not be summed across companies or subsectors to produce a national total without an explicit accounting boundary. An operator's purchased equipment emissions may overlap with the direct emissions of equipment manufacturers, while use-phase emissions can overlap with electricity-sector inventories. For shared or transferred infrastructure, countries should apply and disclose a common attribution rule, preferably based on operational control, and verify that the same energy use or emissions are not reported by both the telecommunications operator and the infrastructure owner. National aggregates should state the organizational and geographic perimeter covered.

8.4 Units, fiscal years and time series

A standard conversion approach is required, with original values retained for traceability. For example, energy may be disclosed in gigajoules or megawatt-hours. Reporting periods may not align with calendar years. The framework should define how fiscal-year data are assigned and encourage at least two years of data initially, moving towards a longer time series as reporting becomes established. A general rule for non-calendar year data is to allocate it to the year over which most of the activity occurs. For instance, for a fiscal year ending 31 March 2025, the data should be allocated to calendar year 2024 (9 months of the activity took place in calendar year 2024).

9. Key takeaways, recommendations and next steps

The 2026 work confirms the operational feasibility of initiating national ICT environmental data collection for a limited core of indicators, particularly for telecommunications operators. Implementation will need to be progressive in the majority of countries because mandates and source data are distributed across ICT regulators, environmental authorities, statistical offices and energy agencies. However, it should be implemented as rapidly as possible to support international commitments and targets for pollution reduction and environmental sustainability. Further testing is required before completing and internationally comparable national estimates for the whole ICT sector can be produced consistently. The priority

questionnaire provides a realistic common starting point, while the complete framework should be retained as a longer-term reference for progressive expansion.

The overall message from the country pilots and technical consultations is as follows:

- Telecommunications operators are the most feasible starting point because regulators can identify the main companies and many operators already disclose core climate and energy indicators.
- Public company reports work well for pre-populating the questionnaire, but direct engagement is needed to confirm national boundaries, fill gaps and resolve inconsistencies.
- Successful implementation depends not only on obtaining data, but also on establishing an ongoing dialogue with reporting companies to clarify methodologies, improve data quality and progressively strengthen reporting practices
- Inter-institutional coordination is essential, for example, a telecom regulator may be well placed to coordinate collection, but environmental and statistical authorities may hold the mandate . In such cases, ITU should consider collecting data directly from these organizations/agencies.
- Data centres and manufacturers are more difficult to cover because national inventories are incomplete, global companies rarely disclose country-level information, and detailed site or plant data may be confidential.
- The full indicator framework should remain longer-term priority, but implementation should begin with the priority set and expand only as national capacity, mandates and data availability improve. Where feasible, data should also be collected on Scope 3 emissions.
- Clear definitions, quality metadata, confidentiality safeguards and rules for aggregation are essential before national figures are compared or combined.
- The goal is not only to collect data, but to establish a recurring evidence base that can support policy, target setting, investment decisions and measurable reductions in the environmental impact of digital infrastructure.

The Subgroup's work has focused on establishing a harmonized framework for monitoring the direct environmental impacts of the ICT sector through greenhouse gas emissions and energy indicators. While this represents an essential first step, a comprehensive assessment of the ICT sector's contribution to climate objectives should also consider its enabling effects on emissions reductions across other sectors of the economy. This should be considered as a subsequent phase of work, once the core framework has been established. Methodologies to assess these enabling impacts are being developed in other ITU-T activities and should be regarded as complementary to the present work rather than part of the current monitoring framework.

Recommended next steps

- Adopt the revised priority questionnaire as the recommended starting point for national implementation, while retaining the full indicator framework as a longer-term collection pathway. Where feasible, , and methodologically documented, countries may also collect Scope 3 emissions without aggregating them into national totals.
- Develop concise methodological guidance covering sector boundaries, company selection, national allocation, fiscal years, unit conversion, data validation, market coverage, Scope 3 treatment, shared infrastructure, double counting and confidentiality to further guide countries to begin national data collection.
- Encourage countries to begin with facilities-based telecommunications operators and to select respondents representing at least 80 per cent of the national market where feasible, while documenting the selected coverage measures.
- National collecting entities should use company sustainability reports, regulatory statistics and existing environmental disclosures to pre-populate questionnaires before requesting additional information from companies. It requires companies to verify values, boundaries, methods and assumptions.

- Support countries in establishing governance arrangements among telecommunications regulators, ministries, environmental authorities, energy agencies and national statistical offices, with a designated national focal point and clear data-sharing responsibilities.
- Continue pilot implementation in a geographically diverse group of countries and document both successful collection and cases where institutional or data barriers prevent implementation. Volunteer countries should use a common results template that records respondents, market coverage, indicators obtained, methods, confidentiality treatment and lessons learned.
- Review the priority list after at least one additional pilot cycles, adding or removing indicators only where policy value, methodological robustness and feasibility have been demonstrated.

Establish a continuing discussion forum under EGTI supported by the CET Division of BDT to share implementation experience, methodological questions and country case studies. The forum should report periodically to EGTI and support the preparation and maintenance of the implementation guidance.

Annex A. Full indicator list

The following list consolidates the detailed indicators contained in the full questionnaire. Priority scores are shown as environmental relevance and feasibility of data collection, where 1 indicates the highest priority or feasibility and 3 the lowest. “Core” identifies indicators retained in the revised priority questionnaire. The annex is a long-term reference and should not be interpreted as a requirement that all indicators be collected immediately.

A.1 Telecommunications operators

Indicator	Unit	Priority: relevance/ feasibility	Revised priority questionnaire
Scope 1 GHG emissions	tCO ₂ e	1 / 1	Core
Scope 2 GHG emissions - location-based	tCO ₂ e	1 / 1	Core
Scope 2 GHG emissions - market-based	tCO ₂ e	2 / 1	Core
Scope 3 GHG emissions	tCO ₂ e	2 / 3	
Scope 3 Category 1: Purchased goods and services	tCO ₂ e	2 / 3	
Scope 3 Category 2: Capital goods	tCO ₂ e	2 / 3	
Scope 3 Category 8: Upstream leased assets	tCO ₂ e	2 / 3	Core
Scope 3 Category 11: Use of sold products	tCO ₂ e	2 / 3	
Scope 3 Category 3: Fuel and energy related activities	tCO ₂ e		
Scope 3 Category 4: Upstream transportation and distribution	tCO ₂ e		
Scope 3 Category 5: Waste generated in operations	tCO ₂ e		
Scope 3 Category 6: Business travel	tCO ₂ e		
Scope 3 Category 7: Employee commuting	tCO ₂ e		
Scope 3 Category 9: Downstream Transportation and Distribution	tCO ₂ e		
Scope 3 Category 10: Processing of sold products	tCO ₂ e		
Scope 3 Category 12: End of life treatment of sold products	tCO ₂ e		
Scope 3 Category 13: Downstream leased assets	tCO ₂ e	2/3	Core
Scope 3 Category 14: Franchises	tCO ₂ e		
Scope 3 Category 15: Investments	tCO ₂ e		
Total energy consumption	MWh	1 / 1	Core

Indicator	Unit	Priority: relevance/ feasibility	Revised priority questionnaire
Of which: Total energy consumption of telecom networks	MWh	1 / 1	Core
Total electricity consumption	MWh	1 / 1	Core
Total renewable/low-carbon electricity consumption	MWh	1 / 1	Core
Renewable electricity consumption from PPAs	MWh	2 / 2	
Renewable electricity consumption from guarantees of origin	MWh	2 / 2	
Renewable electricity consumption generated on site	MWh	2 / 2	
Energy consumption of mobile networks	MWh	2 / 2	
Energy consumption of 2G local loops	MWh	3 / 3	
Energy consumption of 3G local loops	MWh	3 / 3	
Energy consumption of 4G local loops	MWh	3 / 3	
Energy consumption of 5G local loops	MWh	3 / 3	
Energy consumption of fixed networks	MWh	2 / 2	
Energy consumption of PSTN copper loops	MWh	3 / 3	
Energy consumption of DSL copper loops	MWh	3 / 3	
Energy consumption of FttH/O loops	MWh	3 / 3	
Energy consumption of local loops with coaxial termination	MWh	3 / 3	
Energy consumption of other local loops	MWh	3 / 3	
Energy consumption of other network elements (core and aggregation)	MWh	2 / 2	
Electricity consumption of internet boxes and set-top boxes used by customers	MWh	1 / 3	

A.2 Data centre operators

Indicator	Unit	Priority: relevance/ feasibility	Revised priority questionnaire
Number of data centres in the country	Number	1 / 1	Core
Scope 1 GHG emissions	tCO ₂ e	1 / 1	Core
Scope 2 GHG emissions - location-based	tCO ₂ e	1 / 1	Core

Indicator	Unit	Priority: relevance/ feasibility	Revised priority questionnaire
Scope 2 GHG emissions - market-based	tCO ₂ e	2 / 1	Core
Scope 3 GHG emissions	tCO ₂ e	2 / 3	
Scope 3 Category 1: Purchased goods and services	tCO ₂ e	2 / 3	
Scope 3 Category 2: Capital goods	tCO ₂ e	2 / 3	
Scope 3 Category 8: Upstream leased assets	tCO ₂ e	2 / 3	Core
Scope 3 Category 11: Use of sold products	tCO ₂ e	2 / 3	
Scope 3 Category 3: Fuel and energy related activities	tCO ₂ e		
Scope 3 Category 4: Upstream transportation and distribution	tCO ₂ e		
Scope 3 Category 5: Waste generated in operations	tCO ₂ e		
Scope 3 Category 6: Business travel	tCO ₂ e		
Scope 3 Category 7: Employee commuting	tCO ₂ e		
Scope 3 Category 9: Downstream Transportation and Distribution	tCO ₂ e		
Scope 3 Category 10: Processing of sold products	tCO ₂ e		
Scope 3 Category 12: End of life treatment of sold products	tCO ₂ e		
Scope 3 Category 13: Downstream leased assets	tCO ₂ e	2/3	Core
Scope 3 Category 14: Franchises	tCO ₂ e		
Scope 3 Category 15: Investments	tCO ₂ e		
Total energy consumption	MWh	1 / 1	Core
Total electricity consumption	MWh	1 / 1	Core
Total renewable/low-carbon electricity consumption	MWh	1 / 1	Core
Annual energy consumption of data centers	MWh	1 / 1	Core
Annual electricity consumption of IT equipment	MWh	1 / 1	Core
Power Usage Effectiveness (PUE)	Ratio	2 / 3	Core
Power load of data centres	MW	1 / 1	Core
Total energy consumption of which renewable electricity from PPAs	MWh	2 / 2	

Indicator	Unit	Priority: relevance/ feasibility	Revised priority questionnaire
Total energy consumption of which renewable electricity from guarantees of origin	MWh	2 / 2	
Total energy consumption of which renewable electricity generated on site	MWh	2 / 2	
Water consumption	m ³	1 / 2	
Potable water consumption	m ³	1 / 3	

A.3 End-user device manufacturers

Indicator	Unit	Priority: relevance/ feasibility	Revised priority questionnaire
Scope 1 GHG emissions	tCO ₂ e	1 / 1	Core
Scope 2 GHG emissions - location-based	tCO ₂ e	1 / 1	Core
Scope 2 GHG emissions - market-based	tCO ₂ e	2 / 1	Core
Scope 3 GHG emissions	tCO ₂ e	2 / 3	
Scope 3 Category 1: Purchased goods and services	tCO ₂ e	2 / 3	
Scope 3 Category 2: Capital goods	tCO ₂ e	2 / 3	
Scope 3 Category 8: Upstream leased assets	tCO ₂ e	2 / 3	
Scope 3 Category 11: Use of sold products	tCO ₂ e	2 / 3	
Scope 3 Category 3: Fuel and energy related activities	tCO ₂ e		
Scope 3 Category 4: Upstream transportation and distribution	tCO ₂ e		
Scope 3 Category 5: Waste generated in operations	tCO ₂ e		
Scope 3 Category 6: Business travel	tCO ₂ e		
Scope 3 Category 7: Employee commuting	tCO ₂ e		
Scope 3 Category 9: Downstream Transportation and Distribution	tCO ₂ e		
Scope 3 Category 10: Processing of sold products	tCO ₂ e		
Scope 3 Category 12: End of life treatment of sold products	tCO ₂ e		
Scope 3 Category 13: Downstream leased assets	tCO ₂ e		
Scope 3 Category 14: Franchises	tCO ₂ e		

Indicator	Unit	Priority: relevance/ feasibility	Revised priority questionnaire
Scope 3 Category 15: Investments	tCO ₂ e		
Total energy consumption	MWh	1 / 1	Core
Total electricity consumption	MWh	1 / 1	Core
Total renewable /low-carbon electricity consumption	MWh	1 / 1	Core
Renewable electricity from PPAs	MWh	2 / 2	
Renewable electricity from guarantees of origin	MWh	2 / 2	
Renewable electricity generated on site	MWh	2 / 2	
Volume of precious metals and rare earth elements used to manufacture devices	kg	1 / 3	
Plant name	Text	1 / 2	
Pant commissioning date	Text		
Name of the municipality in which the plant is located	Text	1 / 2	
Total energy consumption of manufacturing plants	MWh	1 / 1	
Total water consumption of manufacturing plants	m ³	1 / 2	
Potable water consumption of manufacturing plants	m ³	1 / 3	

A.4 Network equipment manufacturers

Indicator	Unit	Priority: relevance/ feasibility	Revised priority questionnaire
Scope 1 GHG emissions	tCO ₂ e	1 / 1	Core
Scope 2 GHG emissions - location-based	tCO ₂ e	1 / 1	Core
Scope 2 GHG emissions - market-based	tCO ₂ e	2 / 1	Core
Scope 3 GHG emissions	tCO ₂ e	2 / 3	
Scope 3 Category 1: Purchased goods and services	tCO ₂ e	2 / 3	
Scope 3 Category 2: Capital goods	tCO ₂ e	2 / 3	
Scope 3 Category 8: Upstream leased assets	tCO ₂ e	2 / 3	
Scope 3 Category 11: Use of sold products	tCO ₂ e	2 / 3	

Indicator	Unit	Priority: relevance/ feasibility	Revised priority questionnaire
Scope 3 Category 3: Fuel and energy related activities	tCO ₂ e		
Scope 3 Category 4: Upstream transportation and distribution	tCO ₂ e		
Scope 3 Category 5: Waste generated in operations	tCO ₂ e		
Scope 3 Category 6: Business travel	tCO ₂ e		
Scope 3 Category 7: Employee commuting	tCO ₂ e		
Scope 3 Category 9: Downstream Transportation and Distribution	tCO ₂ e		
Scope 3 Category 10: Processing of sold products	tCO ₂ e		
Scope 3 Category 12: End of life treatment of sold products	tCO ₂ e		
Scope 3 Category 13: Downstream leased assets	tCO ₂ e		
Scope 3 Category 14: Franchises	tCO ₂ e		
Scope 3 Category 15: Investments	tCO ₂ e		
Total energy consumption	MWh	1 / 1	Core
Total electricity consumption	MWh	1 / 1	Core
Total renewable /low-carbon electricity consumption	MWh	1 / 1	Core
Renewable electricity from PPAs	MWh	2 / 2	
Renewable electricity from guarantees of origin	MWh	2 / 2	
Renewable electricity generated on site	MWh	2 / 2	
Volume of precious metals and rare earth elements used in equipment sold nationally	kg	1 / 3	
Plant name	Text	1 / 2	
Pant commissioning date	Text		
Name of the municipality in which the plant is located	Text	1 / 2	
Total energy consumption of equipment manufacturing plants	MWh	1 / 1	
Total water consumption of equipment manufacturing plants	m ³	1 / 2	
Potable water consumption of equipment manufacturing plants	m ³	1 / 3	

Annex B. Suggested metadata to accompany data collection

Metadata field	Description
Reporting entity	Company or institutional source providing the value
Reference year	Calendar or fiscal year covered by the data
Organizational boundary	Operational control, financial control or equity share, where relevant
Geographical coverage	Geographical coverage
Subsector coverage	Telecom networks, data centres, manufacturing or other activity included
Data source	Primary source of the reported data, namely company report, regulatory return, environmental registry, direct questionnaire or estimate
Allocation driver	Revenue, subscribers, traffic, floor area, installed power or other driver
Market coverage	Share of the relevant national market represented by respondents
Unit and conversion	Original unit, conversion factor and final unit
Confidentiality status	Public, restricted, aggregate-only or confidential
Data quality / status	Whether the value is measured, estimated, modelled or provisional
Methodology / estimation method	Method used to calculate or estimate the reported value, including any assumptions where relevant, namely breaks in series, among others.

Annex C: Priority Indicator definitions

Indicator (annual data)	Units	Comments and definitions
Emissions		Most companies follow the GHG Protocol Corporate Accounting and Reporting Standard for calculating their CO ₂ e emissions. ¹ The standard identifies three scopes in reference to GHG emissions. Reporting guidance is provided in GRI 305. ² Since many companies report emissions only at the global level, it is essential to define an allocation methodology to estimate emissions at the national level. One recommended approach is to allocate emissions based on turnover or revenue share. ³
Scope 1 GHG emissions	tCO ₂ e	Scope 1 are direct emissions from sources owned or controlled by an organization, resulting directly from company operations. Scope 1 primarily covers consumption of fuels such as for company vehicles; natural gas for building heating or manufacturing; diesel to power equipment and for back-up generators and refrigerants for building air conditioning.
Scope 2 GHG emissions (location-based)	tCO ₂ e	Indirect emissions from the generation of purchased electricity, heat, or steam consumed by the reporting entity, calculated using emissions intensity factors.
Scope 2 GHG emissions (market-based)	tCO ₂ e	Indirect greenhouse gas emissions from the generation of purchased electricity, heat, or steam, calculated using supplier-specific emission factors or contractual instruments (e.g., renewable energy certificates, power purchase agreements) chosen by the reporting entity. Note that market-based emissions are complementary to location-based scope 2 emissions, and that it should not be collected alone, without also having the location-based data. This indicator may not be relevant in countries where renewable energy instruments do not exist.
Scope 3 GHG emissions	tCO ₂ e	Indirect GHG emissions that occur in an organization's value chain but are not included in Scope 1 or Scope 2, including both upstream and downstream activities.
Category 8: Upstream leased assets		Emissions from the operation of assets leased by the reporting organization. For ICT companies, this may include leased network infrastructure, tower sites, office space or data-centre space where the reporting organization does not have operational control.
Category 13: Downstream leased assets		Emissions from the operation of assets owned by the reporting organization and leased to other entities. For ICT companies, this may include infrastructure, equipment, tower space or data-centre capacity leased to customers or other operators.
Energy		Energy includes total consumption of the organization as well as a breakdown by electricity and renewable electricity. Reporting guidance is provided in GRI 302. ⁴ Note that sometimes energy consumption is expressed in gigajoule (GJ). This should be converted to MWh by dividing the figure by 3.6.

¹ World Business Council for Sustainable Development and World Resources Institute. 2004. *A Corporate Accounting and Reporting Standard (Revised Edition)*. <https://ghgprotocol.org/corporate-standard>

² <https://www.globalreporting.org/publications/documents/english/gri-305-emissions-2016/>

³ One recommended approach is to allocate emissions based on turnover or revenue share. For example, emissions attributable to a specific national market can be estimated by applying the ratio of national revenue to global revenue for the products or services covered by the reporting exercise. Emissions should be allocated separately for Scopes 1, 2, and 3. In addition, companies should apply country-specific emission factors where relevant. For instance, emissions associated with production facilities should reflect the energy mix of the country in which the facility operates (e.g. using Belgian electricity emission factors for facilities in Belgium and Chinese electricity emission factors for facilities in China).

⁴ <https://www.globalreporting.org/publications/documents/english/gri-302-energy-2016/>

Indicator (annual data)	Units	Comments and definitions
Total energy consumption	MWh	This includes all energy consumed by an organization including fuels, electricity, heating, cooling, and steam, whether purchased or self-generated.
Total electricity consumption	MWh	Consumption from the use of electricity delivered over the grid.
Total renewable electricity consumption	MWh	Electricity delivered from renewable sources (i.e., through purchases of contractual instruments), on-site renewable electricity generation, and renewable electricity in the electric grid where facilities are located.
Telecom operators		In addition to the emissions and energy indicators above, this indicator applies to telecom operators.
Total energy consumption of telecom networks	MWh	Refers to the energy consumption of the network of the reporting organization
Data centers		In addition to the emissions and energy indicators above, these indicators apply to data center operators.
Number of data centers	Number	Refers to the number of data centers in operation in the country of the reporting organization.
Power load of data centers	MW	Refers to the total power load of all data centers in operation in the country of the reporting organization.
Total energy consumption of data centers	MWh	Energy consumed by all data centers in the country of the reporting organization
Total energy consumption of IT equipment	MWh	Energy consumed by IT equipment in all data centers in the country of the reporting organization.
End-user devices manufacturers		
Total energy consumption of plants for the manufacture of end-user devices and breakdown by plant	MWh	Energy consumed by all device manufacturing plants in the country.

Examples

Telefonica Brasil (Vivo)⁵ Year 2024

Indicator	Units	Comments and definitions
Scope 1 GHG emissions	tCO2e	26,349
Scope 2 GHG emissions (location-based)	tCO2e	85,776
Scope 2 GHG emissions (market-based)	tCO2e	0
Scope 3 Category 8 (Upstream leased assets) GHG emissions	tCO2e	0 "Telefônica Brasil leases space for network infrastructure sharing, but we have the operational control of the energy bill, so the emissions arising from electricity consumption at those sites have already been included in Scope 2."

⁵ Vivo 2024 Integrated Report and 2025 CDP. <https://ri.telefonica.com.br/en/esg/sustainability-reports/>

Indicator	Units	Comments and definitions
Scope 3 Category 13 (Downstream leased assets) GHG emissions	tCO2e	0 "Main downstream leased assets are office buildings and space in data centers. These emissions are already accounted in our scope 1 and 2 emissions as we have operational control of these assets and we pay for the energy consumed."
Scope 3 Category 11 (Product use) GHG emissions	tCO2e	54,261 "Use of Sold Products is one of the most important categories, representing 15,7% of our scope 3 emissions. Category 11 includes emissions from end use of goods and services sold in the reporting year, such as mobile devices, as well as those installed in customer premises, such as routers and set up boxes (STBs). Activity data, emissions factors and calculations of this category are verified by an independent third party. We use two different approaches for calculating category 11 emissions. a) Emissions from the use of mobile devices such as smartphones, feature phones, laptops, tablets, smartwatches or audio devices are calculated by multiplying the number of mobile devices sold (units) (by device type, model, supplier and country) by life stage product emissions (e.g. tCO2e/unit) for each mobile device. b) Emissions from the use of equipment on customer premises, such as routers/broadband and set-top boxes (STBs), are calculated by multiplying the number of products sold (e.g. units) by the annual energy consumption (e.g., kWh/year) associated with each model, the lifetime of the equipment (eg year) and the electricity emission factor (e.g. tCO2/kWh). If consumption is not available for a given technology, then an average consumption by product type is considered to estimate energy use. The energy use is then multiplied by the electricity emission factor for Brazil."
Total energy consumption	MWh	1,938,671
Total electricity consumption	MWh	1,864,700
Total renewable electricity consumption	MWh	1,864,700
Data usage	Peta-bytes (PB)	77,183.8

Ascenty (Brazil)⁶

Number of data centers	Number	28
Power load of data centers	MW	131
Total energy consumption of IT equipment	MWh	
PUE	Number	1.42

⁶ <https://ascenty.com/en/data-centers-en/location/brazil/> and <https://ascenty.com/wp-content/uploads/2025/06/Relatorio-ESG-2024-EN.pdf>