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Digital technologies and NDCs

Solutions supporting implementation



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Digital technologies and NDCs

Solutions supporting implementation

Executive summary

Digital technologies are increasingly prominent in global climate action. They can accelerate overall emissions reduction, strengthen climate adaptation, and address associated loss and damage. While the sector must minimize its own emissions, its potential to enhance climate action is increasingly recognized, both internationally and in national policy frameworks.

This report examines how countries, Parties to the Paris Agreement, reference digital in Nationally Determined Contributions (NDCs) with an end date of 2035, and the extent to which those submissions address the digital sector itself. The analysis is descriptive in nature, building on a series of foundational studies. It is based on 140 official NDC texts submitted to the United Nations Framework Convention on Climate Change (UNFCCC) NDC Registry between 1 January 2024 and 31 July 2026.

The corpus of 140 submissions analysed reveals a significant and growing prominence of digital technologies in NDCs. Almost three quarters of Parties reference digital solutions to be deployed, whereas only about half of submissions in the preceding cycle of NDCs mentioned digital technologies. This pattern is observed consistently across the sample, spanning diverse sectors and domains for climate action.

Key findings

The digital solutions identified can be grouped into four broad categories. The largest is "Data, monitoring, reporting, verification and digital decision-making systems," which encompasses monitoring, reporting and verification (MRV), sectoral information, integrated data platforms, and other systems. The second-largest group is "Early warning systems," mentioned in over half of the NDCs analysed. Next are "Resource efficiency technologies", including electric vehicles, smart grids, smart meters and smart irrigation systems, while the remaining "Others" category includes cybersecurity tools, virtual-reality applications, artificial intelligence (AI) and other emerging technologies.

AI is an area of growing interest, with 12% of the NDCs analysed explicitly referencing AI deployment plans. Use cases span a wide range of functions and sectors, including AI-enhanced early warning systems, predictive monitoring for energy infrastructure, and AI-supported resource management in agriculture and other sectors.

Digital solutions identified cover mitigation, adaptation and loss and damage. In the corpus analysed, 57% of Parties mention digital solutions supporting climate mitigation, such as greenhouse gas (GHG) inventories or e-mobility systems, while 61% mention digital solutions for climate adaptation measures, such as early warning systems and soil- and land-quality monitoring for agriculture and related sectors. In addition, 14% of Parties reference digital solutions to address loss and damage, including satellite imaging and geographic information systems (GIS) to map ongoing trends and climate-finance platforms to disburse funds to affected communities.

Sectoral and thematic coverage is broad. Parties reference digital technologies across 42 distinct sectors and thematic groupings, beyond the essential headings set out by the Intergovernmental

Panel on Climate Change (IPCC, 2019): energy; industrial processes and product use; agriculture, forestry and other land use; and waste. There is no significant concentration in any single sector, and about one third of the digital solutions referenced are not sector-specific. Most solutions are intended for implementation at the national level (73%), with smaller shares targeting regional, local and supranational implementation.

Explicit treatment of "digital" or "ICT" (information and communication technology) as a distinct sector remains extremely rare. Only one Party dedicates a separate sectoral chapter to these technologies. A few Parties refer to greening ICT systems or managing the environmental footprint of digital infrastructure, including through solar-powered ICT hubs, energy-efficient data centres, or ocean thermal energy conversion (OTEC) to serve supercomputers.

How this report is structured

This report starts by outlining the role of digital technologies in climate action and noting related studies. It then establishes and defines key terms and explains its methodology, including which NDCs were captured, how those texts were analysed, how findings were categorized, and the coding framework applied.

The main analytical chapters take stock of digital technologies in NDCs, highlighting the kinds of solutions identified, domains of climate action addressed, sectors and geographic regions covered, plans for implementation and societal, transitional, and innovation dimensions, including engagement of youth, women and Indigenous Peoples. A dedicated section addresses the digital sector in NDCs.

Various national examples illustrate the central issues for digital technologies and NDCs.

Annexes to this report list all NDCs considered and the keyword logic employed in the analysis.

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Introduction

The role of digital technologies in economies, societies and human activities has grown considerably in recent years. As part of this broader trend, digital technologies have become increasingly prominent in climate action, recognized for their potential across a wide range of data and information systems as well as sector-specific applications. This potential is reflected in an increasing number of national climate strategies, including Nationally Determined Contributions (NDCs) under the Paris Agreement.

Adopted in 2015, the Paris Agreement is a legally binding international treaty on climate change (UNFCCC 2015), establishing a collective pathway to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels. Under the Paris Agreement, each Party is to prepare, communicate and maintain successive NDCs that it intends to achieve and to pursue domestic mitigation measures, with the aim of achieving the objectives of those contributions. NDCs primarily set out Parties' mitigation contributions. Parties may also include adaptation components and other information, consistent with the relevant provisions of the Paris Agreement.

Through NDCs, Parties communicate their national efforts to contribute to the collective goals of the Paris Agreement, reflecting their own priorities, needs and national circumstances. Often developed through whole-of-government coordination and multi-stakeholder consultations, NDCs form the backbone of national climate action and reflect the prioritization of actions and resources across sectors.

While the Paris Agreement establishes requirements for NDCs, Parties determine the content of their contributions in accordance with the Agreement and relevant decisions. NDCs typically include mitigation targets expressed in greenhouse gas (GHG) emissions or percentage reductions by a target year. Parties may also include adaptation actions and other information. Some NDCs provide implementation details, including policies, programmes, financing arrangements and monitoring, reporting and verification (MRV) frameworks. Some Parties distinguish between unconditional and conditional components of their NDCs, with the latter dependent on international support, such as finance, technology development and transfer and capacity building.

Given the diversity of approaches that Parties may adopt and the nationally determined nature of NDCs, NDCs are not directly comparable across Parties. Any analysis across submissions must therefore be approached with caution. Taking this into account, the present report seeks to identify overarching trends and notable cases in how digital technologies are reflected in NDCs, while recognizing that each submission must be understood in its own context. The absence of certain information among some NDCs, therefore, is not interpreted as a gap in itself; rather, the trends observed help illustrate the growing relevance that some Parties are placing on specific issues and opportunities.

As further context, the first Global Stocktake (GST) under the Paris Agreement, concluded in 2023, assessed collective progress towards achieving the purpose of the Agreement and its long-term goals and concluded the world is not on track to limit warming to 1.5°C (UNFCCC 2023). The GST highlighted technology development and transfer, alongside finance and capacity building, as critical enablers of effective climate action, while noting persistent gaps

and uneven adoption. These findings underscore the need for closer analysis of how technology is being prioritized, integrated and operationalized within national climate commitments.

This report analyses how Parties reference digital technologies for climate action in NDCs with an end date of 2035, as well as whether the environmental impact of the digital sector is reflected in those NDCs. Coverage extends to all such NDC submissions with 2035 targets from 1 January 2024 to 31 July 2026, including "Information necessary for clarity, transparency and understanding (ICTU)" when annexed to the Party's NDC submission, as captured in the UNFCCC NDC Registry.

The analysis contained in the report is informed by four complementary studies that explored the role of technology in climate action from different yet reinforcing perspectives, thereby establishing a baseline for the interpretation of the results of this analysis.

Firstly, the Climate Technology Centre and Network (CTCN) and the UNFCCC Technology Executive Committee (TEC) – put the topic on the table in 2021 with *Technology and Nationally Determined Contributions (NDCs): Stimulating the Uptake of Technologies in Support of NDC Implementation*, published in 2021 and updated two years later (UNFCCC: CTCN and TEC, 2023). These reports focus on technology needs and challenges, link broad policy to implementation (including under national adaptation plans), and provide examples of successful technology uptake in different Parties and regions.

Also in 2023, the World Bank's *Green Digital Transformation: How to Sustainably Close the Digital Divide and Harness Digital Tools for Climate Action* report examined how digitalization can support climate objectives with a focused analysis of technologies and digital technologies included in the previous cycle of NDCs (World Bank, 2023).

Finally, a brief from the International Telecommunication Union (ITU) in 2025 – *Digital Technologies in NDCs: Stocktake and Analysis* – provided a first glimpse in a sample of 53 NDCs with an end date of 2035, identifying recurring patterns in the ways Parties referenced digital solutions as part of climate implementation (ITU, 2025).

Building on these publications, the analysis in this report addresses a range of important indicators, including some used in the above publications but also new ones of interest in the 2026 global context for climate change and digital technologies. Overall, the present report observes trends and variations in digital solutions to be deployed by Parties in terms of categories and functions, digital solutions across mitigation, adaptation or loss and damage contributions, sectoral coverage and geographic scope, how Parties frame digital technologies in relation to technology transfer and needs statements, as well as how other considerations around implementation and social, transitional and innovation dimensions are articulated.

The next section of the report discusses key concepts and terms, before the "Methodology" section explains the approach adopted, and how the corpus was composed and analysed. The report then proceeds with the main analysis including descriptive statistics and examples, and a dedicated section on the "digital sector" in NDCs.

Definitions

Artificial intelligence (AI): "computerized system that uses cognition to understand information and solve problems" (ITU, 2021).

Climate-smart agriculture: "an approach to transforming and reorienting production systems so that they sustainably increase productivity and incomes, strengthen resilience and adaptative capacity to climate change, and reduce or remove greenhouse gas emissions where possible" (FAO, 2013).

Data platforms / open data: dedicated platforms enabling the trustworthy collection, use and reuse of data, including open data access (World Bank, 2023).

Digital divide: "the uneven distribution, differences or gaps that exist in opportunities to access and use ICTs amongst diverse population groups" (ITU, 2005).

Digital technology: "a system encompassing Information and Communication Technology [ICT] goods, ICT networks and/or ICT services that contributes to meeting a technical, societal or business challenge" (ITU, 2022a). In this context, climate change and its impacts represent the challenge, with different digital technologies presented as solutions to be deployed in Parties' NDCs.

Digital twin network: "a virtual representation of a physical network. It is useful for analysing, diagnosing, emulating, and controlling the physical network based on data, model, and interface to achieve a real-time interactive mapping between a physical network and a digital twin network" (ITU, 2022b). It therefore presents a potential decision-support system that can be used, for example, to simulate the impacts of climate change on real-world assets or to predict scenarios and real-time operations of industrial processes (World Bank, 2023).

Internet of Things (IoT): "a global infrastructure enabling advanced services by interconnecting physical and virtual 'things,' based on existing and evolving information and communication technologies" (ITU-T Recommendation Y.2060; ITU, 2012).

Technology: "a piece of equipment, technique, practical knowledge or skills for performing a particular activity" (UNFCCC, 2000).

Methodology

This report reflects a specific methodology applied to examine how Parties reference digital technologies for climate action in NDCs with an end date of 2035, as well as whether the environmental impact of the digital sector *per se* is addressed in those NDCs. The tables and figures contained within the report are derived from an underlying dataset based on this methodology.

The corpus consists of official NDC submissions retrieved from the UNFCCC NDC Registry source. The inclusion criteria for analysis were: 1) Submission date between 1 January 2024 and 31 July 2026, including "Information necessary for clarity, transparency and understanding (ICTU)" when annexed to the Party's NDC submission, as captured in the UNFCCC NDC Registry; 2) an NDC with an end date of 2035; and 3) status as an official NDC submission. Therefore, NDCs submitted in 2026 and labelled "NDC 3.0", for instance, but with a target year of 2030, did not meet the methodological requirements and were thus not included in the analysis for comparison. Restricting the sample to a common end date is intended to support comparability, since mixing 2030 and 2035 time frames could affect interpretation of the measures and targets reported. Some Parties, notably, have submitted more than one NDC during the period in question, reflecting different time-bound targets. Other NDCs were submitted as "provisional," yet mentioned digital solutions and were therefore included in the analysis. A total of 140 NDCs met the inclusion criteria.

To address the multilingual nature of NDCs, documents were reviewed directly in their original language, relying on official translations submitted by Parties in a limited number of cases. Machine-translated NDC documents were not used in the preparation of this report. In the exceptional instance where an NDC was submitted as a scanned or image-based document rather than in a machine-readable format, the document was reviewed in its entirety through manual examination rather than keyword search to identify relevant references.

A structured approach was then adopted to identify references to digital technologies in NDCs, comprising use of a curated keyword list, case-by-case manual contextual review of search results in surrounding passages of text and NDC sections, and subsequent data cleaning and validation. The keyword list was developed from two knowledge bases previously used by the World Bank (2023) and CTCN and TEC (2021 and 2023) reports referenced in the present report's Introduction. The World Bank's original keyword list was retained, along with methodological decisions to ensure baseline comparability, but the list was expanded to include emerging digital technologies, namely those identified in the United Nations Educational, Scientific and Cultural Organization (UNESCO) glossary on digitalization and digital technologies (UNESCO, 2025).

Grammatical variants of the keywords, related terms, plural forms and any other relevant derivations were considered, aiming to improve detection while preserving contextual accuracy (Annex B). The keyword search enabled the discoverability of relevant passages and excerpts. However, results were not automatically counted for the totals in this analysis since each result underwent an additional contextual review prior to inclusion.

The expanded keyword list was linked to a category system, whereby digital solutions identified were categorized as either: "Data, monitoring, reporting, verification and digital decision-making systems", "Early warning systems", "Resource efficiency technologies" or "Others".

Furthermore, this analysis introduced a categorization through which identified solutions were further classified according to whether the Party references the direct deployment of the digital solution or its indirect deployment. Direct deployment is where a Party referenced the use of a specific digital technology, platform or system, or otherwise asserted a specific technical elevation, such as being described as advanced, modernized or integrated. The indirect deployment, in contrast, is applied where an NDC reference implied the use of a minimum digital capability that is now inherent to the functioning of the solution, even if no specific digital technology was explicitly named. Accordingly, the solution was classified as an indirect deployment only where the digital component functioned as an enabling layer of the broader intervention rather than as a distinct digital solution explicitly articulated in the NDC or it constituted a standard embedded feature of the technology being deployed.

Digital solutions identified were also analysed with respect to their sectoral or thematic focus. In some cases, these were articulated by Parties in ways that did not necessarily fit in the sectors defined by the Intergovernmental Panel on Climate Change (IPCC, 2019) in the Guidelines for National Greenhouse Gas Inventories (energy; industrial processes and product use; agriculture, forestry and other land use; and waste). Therefore, the sectors and thematic areas were examined in terms of Parties' own language used in their NDCs.

Further analysis of the NDCs and relevant excerpts referencing digital solutions was applied to facilitate descriptive analysis. Multi-attribute tagging was used, owing to the fact that some excerpts contained more than one characteristic of interest. For example, as is the case with Nepal's NDC, a single excerpt might relate to a "Digital divide commitment", as well as "Gender considerations" and "Other technologies". Accordingly, percentage distributions based on multi-attribute classifications are not mutually exclusive and may sum to more than 100% in certain cases, such as sectoral and geographical scope classifications.

A deduplication logic was applied to avoid double counting in relevant totals: the same digital solution may sometimes appear more than once in NDCs, for example in narrative text and then again later in annexed tables. Cross-checking ensured single counting of each digital solution.

Relatedly, some bundled components were counted as single measures, whereas others were counted as multiple. The treatment depended upon the digital architecture or system described, and the separation of objectives in the text, prioritizing consistency with each Party's apparent interpretation of its NDC. For example, monitoring, data systems and geographic information systems (GIS) are conceptually different but technically often interlinked. In line with the latest realities of climate technology, these complementary components were often treated as a single climate information architecture if covering the same thematic area, under the same status of conditionality and concerning the same objective, unless explicitly presented as distinct.

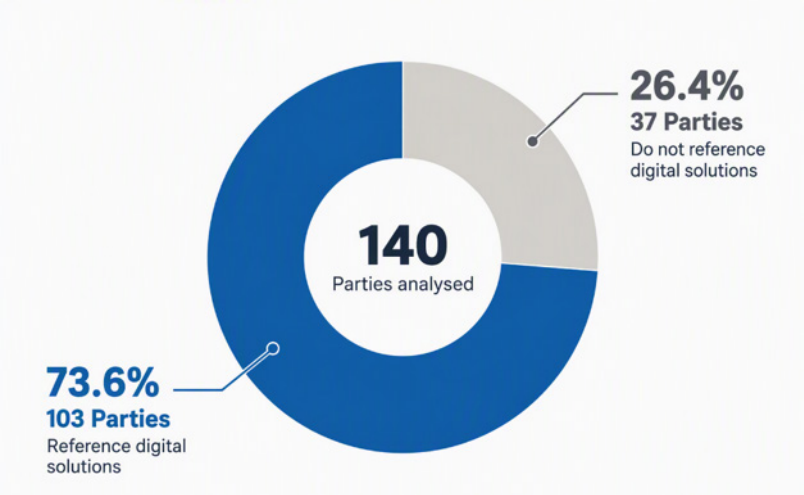
Importantly, NDCs also vary substantially in length, structure and extent of implementation detail. This, clearly, has implications for what can be extracted consistently from the text across Parties' submissions. Some NDCs may describe digital measures in detailed and operational terms, while others may use broad or aspirational language. The report therefore limits itself to content that can be identified directly and consistently in the submissions. Attention is placed on the textual treatment of digital technologies in official submissions, capturing both explicit references to digital tools to be deployed, and the ways in which digital-enabling conditions, institutions, sectors and support needs are incorporated into NDC language.

Digital technologies in NDCs

References to digital technologies in NDCs are numerous and varied. This section offers a picture of how Parties to the Paris Agreement are currently envisioning the role of digital technologies in their NDCs, by analysing their deployment across specific dimensions and indicators.

In the NDC corpus of 140 submissions, there is a large degree of variation in the way in which Parties refer to digital technologies, ranging from more general consideration and proposals to highly focused and ambitious plans to deploy emerging and frontier digital technologies. Overall, as shown in Figure 1 below, 74% of Parties reference digital technologies in an operational manner or express an active commitment (i.e. as digital solutions to be deployed).

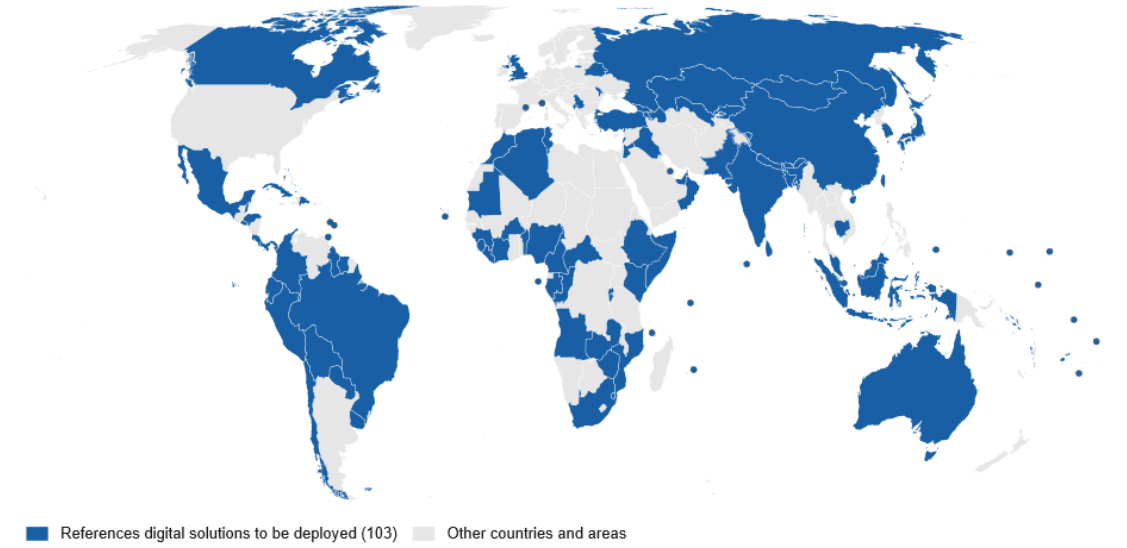
Figure 1: Share of Parties referencing digital solutions to be deployed



Source: ITU, based on NDCs submitted to the UNFCCC NDC Registry between 1 January 2024 and 31 July 2026.

The integration of digital technologies in 2035 NDCs is particularly pronounced among developing countries. Excluding the European Union, which is not included in the country classification, 97% of the 95 Parties classified as developing (92) reference digital solutions to be deployed, compared with 25% of the 44 classified as developed (11). Across both country classifications, Figure 2 provides a geographic overview of all 103 Parties referencing digital solutions to be deployed.

Figure 2: Parties referencing digital solutions to be deployed



Note: The designations employed and the presentation of material on the map do not imply the expression of any opinion whatsoever on the part of ITU and of the secretariat of ITU concerning the legal status of the country, territory, city or area or its authorities, or concerning the delimitation of its frontiers or boundaries. The base map is the UNmap database of the United Nations Cartographic Section. 103 of the 140 Parties whose NDCs with 2035 targets were analysed (74%) reference digital solutions to be deployed; 95 of them reference the direct deployment of at least one digital solution. Small island and micro-States are shown as circles.

Source: ITU, based on NDCs submitted to the UNFCCC NDC Registry between 1 January 2024 and 31 July 2026.

Of the 74% Parties referencing the deployment of digital solutions, 68% referenced their intent to deploy digital solutions directly, naming a specific technology, platform or system in at least one instance. In contrast, 6% of Parties refer to the indirect deployment of digital solutions by describing the use of a minimum digital capability that is inherent to the functioning of the solution, even if no specific technology was explicitly named. In these latter cases, the digital component functions as an enabling layer (rather than a solution in its own right) or constitutes a standard, embedded feature of the technology being deployed.

This represents a significant increase from the roughly half of submissions that mentioned digital technologies in the baseline study by the World Bank (2023).

Considering the particular case of the European Union and its individual Member States as separate Parties to the Paris Agreement, an additional total based on unique NDC documents is provided. This complementary figure accounts for the number of unique NDC texts represented in the dataset, as the analysis based solely on Parties counts the same NDC submission multiple times. On this basis, it is noteworthy that 91% of unique NDC documents contain references to digital technologies.

A large majority of submissions (90%) also include reference to non-digital technologies. Many of these relate to renewable energy technologies and carbon capture and storage, as well as water and agricultural technologies, among others.

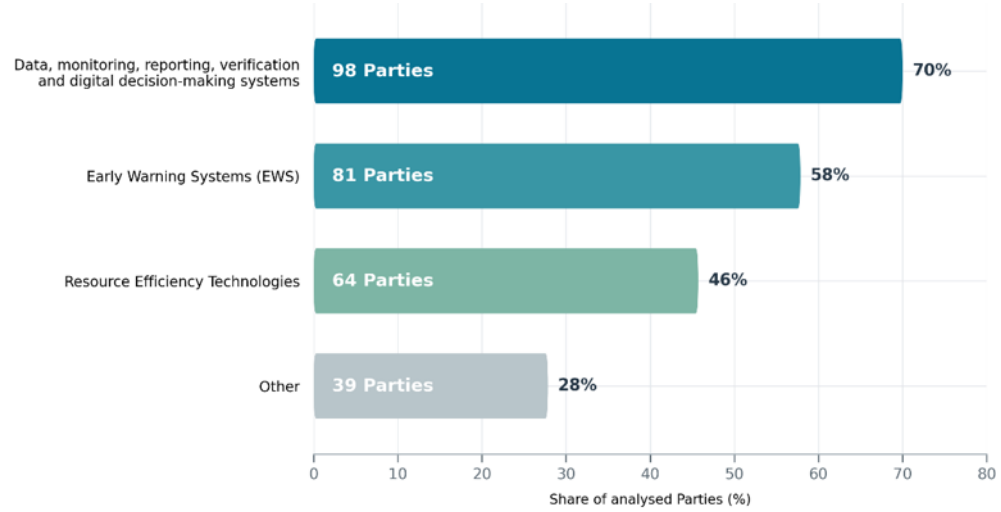
Where digital technologies are referenced, they span a wide spectrum. Sometimes they appear as high-level cross-cutting enablers, such as highlighting use of ICT and innovation for adaptation. In other instances, they are briefly integrated into a broader statement, for example investment in e-mobility as part of wider transport plans, or data tools to support broader monitoring efforts. Other planned deployments provide more detail on a suite of digital measures within or across sectors.

> Kazakhstan's NDC, for example, sets out the deployment of automated heat, water and electricity meters, alongside the integration of digital accounting and energy management systems (Republic of Kazakhstan, 2025).

Solutions categorized

Overall, the digital solutions identified can be classified into common categories, as highlighted in the "Methodology" section. As illustrated in Figure 3 below, the most prevalent category of digital solution referenced by Parties is "Data, monitoring, reporting, verification and digital decision-making systems," cited by 70% of Parties. This is followed by "Early warning systems" (EWS), referenced by 58% of Parties, and "Resource efficiency technologies," cited by 46%. A further 28% of Parties reference digital solutions that fall under the "Others" category.

Figure 3: Categories of digital solutions



Note: Percentages are calculated out of 140 analysed Parties. Categories are not necessarily mutually exclusive.

Source: ITU, based on NDCs submitted to the UNFCCC NDC Registry between 1 January 2024 and 31 July 2026.

Many "Data, monitoring, reporting, verification and digital decision-making systems" referenced in the sample of NDCs are MRV systems, highlighting one of the most prominent emerging digital priorities among Parties. One of the recurring priorities is the deployment of digital MRV systems to support NDC implementation. These systems are not only cited to collect and validate data, but also to monitor progress on individual measures, tracking implementation across sectors, and enabling course correction in some cases. Reflecting this trend, at least one quarter of the Parties citing "Data, monitoring, reporting, verification and digital decision-making

systems" specifically reference digital solutions for tracking NDC implementation. Other common functions and examples include databases or digital platforms for integrating and storing data within sectors.

> The Dominican Republic's third NDC illustrates this trend clearly, presenting its National Climate Transparency System not as a single tool but as an architecture of several distinct subsystems, each responsible for a different subset of climate data (Dominican Republic, 2026). Similarly, Russia's second NDC references a monitoring system built around unmanned aerial systems and artificial intelligence (AI) to track solid municipal waste disposal sites (Russian Federation, 2025).

Approximately 58% of the NDC corpus references deployment of early warning systems. Early warning systems are often presented in texts as multi-hazard, integrated systems operating in a single architecture. In other instances, their remit is more narrowly focused on a specific hazard, risk or vulnerability within a sector, zone or domain, such as floods and bushfires affecting the agriculture sector, coastal zones or pastoral domains. Some references focus on risk communication, highlighting SMS or WhatsApp alerts.

> For example, Guinea outlines local alerts linking weather, hydrological and natural hazard information with schools via SMS and WhatsApp, alongside simple sirens (Republic of Guinea, 2025). Other early warning systems are framed as broader resilience systems for communities, sometimes embedded in different local institutions and response structures. Rwanda, in turn, illustrates a more narrowly technical instance of this, setting out a commitment to operationalize IoT-based flood sensors and AI-powered early warning systems across ten high-risk zones, specifying the sensor network, the alerting function it supports, and the named institutions responsible for delivery (Republic of Rwanda, 2025).

Prevalent "Resource efficiency technologies" that Parties plan to deploy include: electric vehicles and smart charging infrastructure; smart grids; smart meters; smart lighting; smart irrigation; and other smart solutions for transport, energy, buildings, water and agriculture. While these technologies often include physical infrastructure components, they are classified as digital solutions because their functionality relies on digital sensing, connectivity, data processing, and automated decision-making capabilities. These features enable more efficient use of resources and more effective management of infrastructure systems at scale.

With respect to "Others", the digital solutions to be deployed are highly diverse and include AI, augmented reality, automation systems, big data analytics, blockchain, cloud computing, cybersecurity technologies, digital public infrastructure, digital twins, drones and unmanned aerial systems, e-governance systems, e-learning and remote learning platforms, the Internet of Things and sensor networks, mixed reality, mobile applications, remote sensing technologies, social media and digital media tools, telemetrics, traceability technologies, and virtualization. These technologies are referenced across a wide range of sectors and applications and, in some cases, complement or enable the implementation of the solution categories discussed

above. Given their broad dispersion and the limited number of references to each individual technology, they do not lend themselves to further meaningful sub-categorization and are therefore grouped under a single "Others" category.

> Brazil's NDC includes a noteworthy example of this typology of digital solutions, situating a national land registry as part of its digital public infrastructure. The NDC describes the Ministry of Management and Innovation in Public Services' ongoing modernization of the National System of the Rural Environment Registry (CAR), which is to be integrated with other systems within Brazil's digital public infrastructure as a means of guaranteeing effective compliance with the country's Forest Code (Federative Republic of Brazil, 2024).

Some Parties also describe digital solutions that facilitate activities such as training and capacity-building, communication, digital engagement and participation, innovation and experimentation.

> Some notable examples include Uruguay's NDC with actions on digital engagement and participation, embedding citizen-generated data into formal coastal adaptation monitoring: a remote monitoring system combines satellite imagery, fixed-camera recordings and citizen-submitted photographs, explicitly described as a national adaptation of the global CoastSnap citizen-science initiative (Oriental Republic of Uruguay, 2024). On training and capacity-building, Azerbaijan's NDC 3.0 names a specific immersive technology application within its capability-building agenda: the introduction of virtual reality and augmented reality tools to strengthen climate education (Republic of Azerbaijan, 2025).

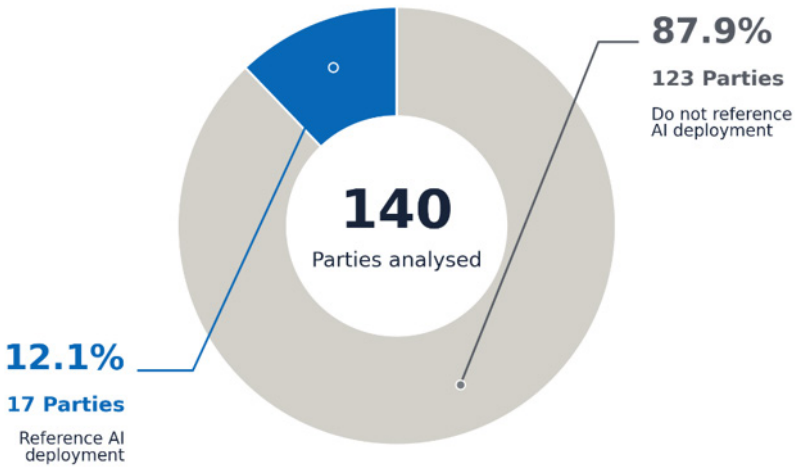
AI represents an emerging area of interest for Parties, with its potential to enable adaptation to the impacts of climate change and reduction of greenhouse gas emissions via diverse use cases (UNFCCC, 2025). Indeed, as shown in Figure 4 below, 12% of the NDCs analysed explicitly reference AI to be deployed. In several instances, AI is highlighted to strengthen early warning systems and enhance weather forecasts.

> The Republic of Korea's 2035 NDC illustrates this directly, as infrastructure previously designed on the basis of historical meteorological data will be revised to account for future climate scenarios, with early warning systems for floods, wildfires and other hazards strengthened through the use of AI technologies (Republic of Korea, 2025).

AI also features as a tool to support monitoring, management and maintenance (for example AI-based predictive monitoring), notably for energy infrastructure, but also in the agriculture, building, industry, transport, waste and water sectors. The use cases span loss and damage, mitigation and adaptation actions.

In Morocco's NDC, AI is referenced alongside IoT and sensors to improve energy efficiency and resource management in the agriculture sector, as a concrete mitigation commitment (Kingdom of Morocco, 2026).

Figure 4: Parties referencing artificial intelligence solutions to be deployed



Source: ITU, based on NDCs submitted to the UNFCCC NDC Registry between 1 January 2024 and 31 July 2026.

Digital technologies for mitigation, adaptation and loss and damage

The digital solutions identified in the 140 NDCs span mitigation, adaptation and loss and damage domains, while some can be considered cross-cutting (i.e. addressing multiple domains, or not explicitly addressing one in isolation). Figure 5 at the bottom of this sub-section outlines the share of Parties planning to deploy digital solutions across the three climate action domains.

61% of Parties reference digital solutions related to adaptation actions. Alongside solutions related to "Data, monitoring, reporting, verification and digital decision-making systems" and "Early warning systems", these also include a small number of "Resource efficiency technologies", namely smart water and irrigation solutions.

A similar share (57%) of Parties reference digital solutions related to mitigation actions in their NDCs. As may be expected, these account for a large number of the "Resource efficiency technologies" identified, as well as many solutions categorized as "Data, monitoring, reporting, verification and digital decision-making systems".

Meanwhile, more than half (56%) of the analysed NDCs identified digital solutions as cross-cutting actions, underscoring their growing role across climate action.

14% of Parties frame digital solutions to be deployed as loss and damage-related actions in their NDCs. Just under a third of this share are Small Island Developing States, while most of the others are particularly vulnerable to climate change impacts like sea level rise. The digital solutions identified under this domain are mostly classified in this analysis as "Data, monitoring,

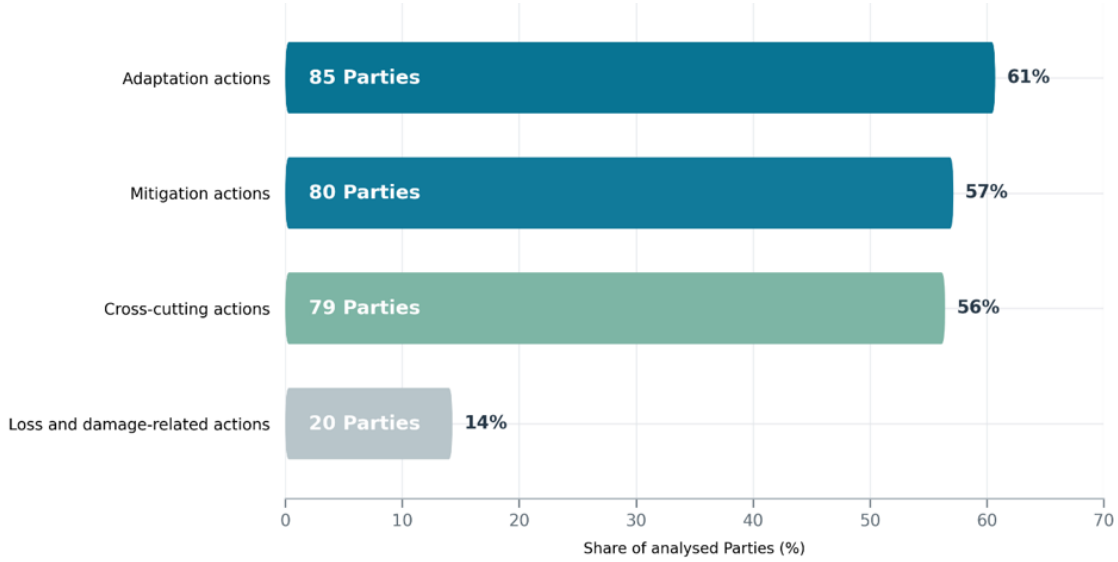
reporting, verification and digital decision-making systems", with several databases and data systems for loss and damage referenced.

> Fiji outlines a multipronged approach, describing digital solutions to address loss and damage, including the use of satellite imaging to track climate impacts, digital platforms for disbursing finance to affected communities, GIS systems for mapping and monitoring loss and damage trends, and the digitization of records documenting cultural practice, traditional knowledge and other information at risk of loss (Republic of Fiji, 2025).

This highlights the potential for digital technologies to also be deployed in tandem with, and in support of, traditional or indigenous knowledge systems and cultural heritage, in the context of climate change and digital transformation.

> Mexico's NDC is another notable example committing to a national programme of digitalization and digital twins of tangible cultural heritage, explicitly for archiving and documenting heritage assets at risk from climate change, alongside real-time monitoring systems for both extreme events and slow-onset phenomena affecting this same heritage (Mexico, 2025).

Figure 5: Digital solutions to be deployed by type of climate action



Note: Percentages indicate the share of analysed Parties referencing digital solutions in each category. These are not mutually exclusive.

Source: ITU, based on NDCs submitted to the UNFCCC NDC Registry between 1 January 2024 and 31 July 2026.

Sectors and geographic scope

Parties reference digital technologies in a range of sectors and thematic areas, beyond those defined in the Guidelines for National Greenhouse Gas Inventories (energy; industrial processes and product use; agriculture, forestry and other land use; and waste), as noted in "Methodology" (IPCC, 2019). Table 1 below lists the sectors and thematic areas as described by Parties in the corpus of NDCs analysed here.

Table 1: Sectors and thematic focal areas for digital technologies referenced in NDCs

#	Sector / theme
1	Adaptive social protection and livelihood resilience
2	Agriculture
3	Agriculture, forestry and other land use
4	Air quality
5	Aquaculture
6	Biodiversity and ecosystems
7	Buildings
8	Coastal zones
9	Community engagement and public awareness
10	Cross-cutting
11	Disaster risk reduction / disaster risk management
12	Education
13	Ecosystem conservation
14	Energy
15	Fisheries
16	Food security and food systems
17	Forestry
18	Gender and youth
19	Governance
20	Health
21	Heat
22	Human mobility and migration
23	Indigenous peoples
24	Industrial processes and product use
25	Industry

Table 1: Sectors and thematic focal areas for digital technologies referenced in NDCs (continued)

#	Sector / theme
26	Information and communications technology
27	Infrastructure
28	Land use, land-use change and forestry
29	Livestock
30	Mining and extractive industries
31	Nutrition
32	Ocean and marine ecosystems
33	Poverty and social inclusion
34	Resilient cities
35	Social protection
36	Strategic infrastructure and tangible cultural heritage
37	Tourism
38	Transport
39	Urban infrastructure and planning
40	Waste
41	Water
42	Water, sanitation and hygiene

The digital solutions identified are not concentrated in specific sectors. Rather, the analysis indicates a relatively even spread across a diverse range of areas, reflecting the broad variety of use cases of digital technologies for climate action. However, not all references to digital technologies are sector-bound. Of all the digital solutions to be deployed, around one third are not sector specific.

Comparison by geographic scope confirms that most of the digital solutions referenced by Parties are intended, explicitly or implicitly, for implementation at the national level. In total, 73% of the NDCs analysed indicate solutions at the national level. 5% indicate implementation explicitly at the regional (subnational) level, while 15% indicate the local level. However, many instances refer to multi-level implementation (10% of the NDCs). In addition, there are a few instances of supranational-level digital solutions.

For example, Andorra refers to a climate services platform with real-time information on climate risks, within the cross-border "PYRENEES4CLIMA" project for the Pyrenees region (Principality of Andorra, 2025). Similarly, Somalia describes transboundary early warning systems in the context of conflict-sensitive resource management (Federal Government of Somalia, 2025).

Targets, costs and implementation modalities

While most Parties talk about deploying digital solutions in more general terms, some delineate highly specific targets, milestones or other quantified references.

For example, Costa Rica is notable for quantifying several coverage targets, geographic areas, projects and infrastructure assets related to digital technologies (Republic of Costa Rica, 2025), while Rwanda counts roll-out of 2,000 e-motorcycles with smart charging stations (Republic of Rwanda, 2025). Paraguay explicitly targets strengthening of its management and information system on water resources by 2035, through the installation of at least 20 measuring stations to improve data capture systems (Republic of Paraguay, 2025). At the other end of this spectrum, Bahrain's NDC shows how digital measures can appear as a layer of proposed, forward-looking measures embedded within sectoral adaptation planning: digital tools are listed among actions "proposed to be taken forward" in its water resources chapter (Kingdom of Bahrain, 2025).

Cost estimates and budget components are also referenced in some NDCs, often depending on how Parties decide to present their contributions. For example, some NDCs include detailed annexes at the end with tables, in addition to narrative text. These tables include columns specifying the sector, specific measures and then total or cumulative United States Dollar (USD) "cost" or "investment" figures for each individual measure (i.e. digital solution).

For example, Côte d'Ivoire refers to such tables as "detailed cost matrixes" for both mitigation and adaptation measures (Republic of Côte d'Ivoire, 2025).

In a significant proportion of cases, Parties also connect digital climate actions to named international partnerships and support modalities, funding instruments or other implementation mechanisms.

For instance, Armenia's NDC describes how the country is establishing a robust Monitoring & Evaluation system for tracking progress, supported by the UN Development Programme's NDC Tracking Tool (Republic of Armenia, 2026). While this example highlights support and partnership with international organizations for implementing a digital measure, other examples like the Marshall Islands' NDC refer to funding instruments like the Green Climate Fund (GCF), for instance a GCF project installing wave buoys to help increase capacity for more accurate and timelier ocean-related data (Republic of the Marshall Islands, 2025).

A larger share of NDCs feature domestic implementation mechanisms such as policy instruments. Often, these appear in general terms. In other cases, however, the NDC names specific policies or laws that will enable or shape implementation.

Beyond these, several Parties highlight plans to strengthen institutional arrangements and develop the institutional capacity of public administration using digital solutions. These include arrangements and plans such as promotion of data sharing mechanisms between institutions, and training of ministerial and subnational government officials in implementing MRV systems and in use of other digital tools.

Technology transfer and needs

As a continued priority for many Parties, technology transfer considerations are a frequent topic covered in this current NDC cycle. Some 43% of NDCs (60) refer to digital technologies in the context of technology transfer. In many instances, technology transfer is presented as an addendum of the conditionality of some of Parties' commitments. Some NDCs outline a broader intention to pursue international technology transfer partnerships related to digital tools.

Others, like El Salvador's, describe digital solutions in the context of a sectoral need, within a specific technology transfer section or sub-section (Republic of El Salvador, 2025). Sierra Leone's NDC, similarly, stands out for dedicating a distinct chapter "Section 7, Capacity & Technology" to a foundational synthesis of current technological priorities, consolidated into a Priority Technology Matrix linking each technology to its rationale and enabling needs, and presented as a first step toward a more in-depth Technology Needs Assessment (Republic of Sierra Leone, 2025).

In most cases, regarding all references to broader digital solutions to be deployed, Parties do not explicitly indicate whether they represent unconditional or conditional contributions. However, of the 140 NDCs analysed, 21% link a given digital solution as being explicitly conditional upon technology transfer, or international finance and capacity building support. Approximately 138 distinct digital solutions were identified to be conditional from the corpus of analysed NDCs, representing around 17% of the digital solutions planned to be deployed by Parties by 2035.

Furthermore, Parties articulate explicit digital technology needs in 41 instances overall, including in the context of past and ongoing Technology Needs Assessments. In most instances, the

statement is framed as a support-related signal (i.e. connected to gaps and challenges), although a smaller number of NDCs list specific digital solutions as a readiness signal, planned by the government but contingent upon support. The digital technology needs referenced span the range of sectors and thematic areas, and are all related to adaptation, mitigation and cross-cutting measures; none are solely highlighted as related to "loss and damage", explicitly.

Social, transitional and innovation dimensions

Social, transitional and innovation dimensions are evident in many NDCs. As cross-cutting issues intrinsic to climate action, these also relate to digital access and inclusion, just transition policies, research and innovation, and other technology-related considerations.

Seven NDCs from Asia-Pacific, Eastern Europe and Latin America and the Caribbean express a commitment to address digital divides (i.e. "*the uneven distribution, differences or gaps that exist in opportunities to access and use ICTs amongst diverse population groups*" [ITU, 2005]) in tandem with reducing emissions and addressing climate change.

> For example, Suriname highlights expansion of access to internet and devices in the country's interior and remote areas, to ensure digital equity and access to e-learning for green skills (Republic of Suriname, 2025). Others refer to improving digital connectivity and digital inclusion.

In the NDCs analysed, one third of Parties articulate digital-related just transition considerations. These are focused on training and employment opportunities, sometimes with reference to specific digital tools like AI. Certain groups, including disabled persons, elderly populations, indigenous peoples, women and youth are specified in some references. In a smaller number of instances, specific regions or geographies are targeted.

> Iraq's NDC connects youth policy directly to digital and AI-skills building, noting that people under 25 make up close to 60% of its population. Iraq commits to training 200,000 young people in green and digital vocational programmes, and reaching 30,000 beneficiaries through training on AI and digital technology in a climate context (Republic of Iraq, 2025).

Relatedly, 37% of NDCs also emphasize gender considerations specifically (beyond explicit just transition references), in the context of digital technologies. For example, a common reference to gender and women is around data disaggregation, such as within MRV systems. Gender references also commonly appear with respect to training, as well as implementation of digital solutions, with efforts expressed to ensure gender-sensitivity and access. A smaller number of NDCs also explicitly highlight strengthening female leadership or expertise in science, technology, engineering, and mathematics (STEM).

22% of Parties refer to research and innovation commitments focused on digital technologies. These cover diverse activities, ranging from youth hackathons to advancing AI-driven energy

optimization, and more general digital-related research & development (R&D) programmes, as well as innovation hubs, research partnerships and grants.

> India's NDC stands out for describing its own push to build up its research and development capabilities for climate-resilient and green digital technologies, tying this to an ambition to rely less on imported technology over time, with specific areas identified as either ready for near-term deployment or still requiring dedicated research (Republic of India, 2026). Meanwhile, on innovation and experimentation, Moldova's NDC 3.0 describes an energy sector sandbox. Launched in November 2024 as the first such initiative in Central and Eastern Europe, through which technologies include smart grids and other digital tools can be trialled in a controlled setting (Republic of Moldova, 2025).

The digital sector in NDCs

As discussed in ITU's 2025 policy brief on digital technologies in NDCs (ITU, 2025), if viewing "digital" as a distinct sector *per se*, its climate and environmental impact is growing. Estimates in the World Bank's 2023 baseline study calculated digital sector emissions to account for between 1.5% and 4% of total global greenhouse gas emissions (World Bank 2023). In practice, within NDCs submitted between 1 January 2024 and 31 July 2026, treatment of "digital" as a sector is extremely rare.

> Vanuatu represents a unique case in which a separate chapter and sectoral focus is dedicated to "ICT". In Vanuatu's NDC, there are eight instances in which digital solutions to be deployed are presented as within the ICT sector. These include, for example, commitments to use ICTs in climate change mitigation as well as adaptation, ensuring that the Government of Vanuatu's planning and response agencies are equipped with the potential to have free access to network infrastructure and resources. A target within the sector also focuses squarely on ICT infrastructure, with Vanuatu committing to achieve full access to broadband ICT infrastructure (Republic of Vanuatu, 2025).

While "digital" or "ICT" are not commonly referred to as a sector in the corpus, there are likewise a very small number of references (four) that allude to considerations of greening ICT systems and assets, or implicit acknowledgement of their environmental footprints.

Suriname outlines rollout of "solar-powered ICT hubs" in its NDC (Republic of Suriname 2025), thereby highlighting a clean energy source. Similarly, Singapore refers to "energy-efficient data centre infrastructure" (Republic of Singapore, 2025). The Marshall Islands describes e-waste collection as an activity in its outer atolls (Republic of the Marshall Islands 2025). In turn, the Bahamas' NDC notes particular interest in pairing ocean thermal energy conversion with seawater district cooling to serve data centres and supercomputers, since this can meet the energy and cooling demands that AI infrastructure requires (Commonwealth of The Bahamas, 2025).

The limited visibility of the digital or ICT sector in NDCs may raise broader questions about the sector's integration into national climate planning processes, and the extent to which its environmental footprint is captured in existing accounting and reporting frameworks.

Conclusion

The high number and diversity of digital technologies identified across this NDC analysis, especially set against the baseline captured by the previous analysis, signals a noteworthy shift in how Parties conceive digital solutions for climate action. Nearly three quarters of Parties reference digital technologies as solutions to be deployed. Rather than appearing as isolated tools tied to individual measures, digital technologies appear to be emerging as a widespread enabling layer, sometimes direct and named, sometimes embedded invisibly into the architecture of a given commitment. In other words, they are becoming part of the institutional and operational infrastructure of NDC implementation. Their prominence in data, monitoring, reporting and verification systems reflects growing appreciations of digital technologies, firstly as tools to track progress transparently, and secondly as sources of actionable intelligence that can inform planning, resource allocation and course correction.

This evolving landscape, while reflecting the growing integration of digital technologies as enablers of climate action, also raises new questions well beyond the technologies themselves. The findings suggest that realizing the potential of digital technologies for climate action is not solely a question of technology availability or deployment. As digital systems take on a more prominent role in implementation, attention will increasingly need to extend to the wider enabling environments in which they operate. This includes the institutional and governance arrangements underpinning digital systems; clear responsibilities for their management and maintenance; interoperability across platforms and data sources; national ownership and stewardship of climate-relevant data; and the infrastructure, skills and institutional capacities required for their sustained use. Questions also remain regarding how capacity can be built to sustain these initiatives, how they can be financed over time, and how technology transfer can be structured to support Parties equitably.

As digital technologies assume a greater role in climate action, greater coherence across climate, technology and digital policy processes may also become increasingly important. Connecting digital priorities identified through NDCs with broader national development, technology and sectoral planning could help individual interventions contribute to more coherent and sustainable digital ecosystems rather than fragmented technology deployments.

At the same time, considerable variation remains in how Parties describe targets, costs, institutional arrangements and support needs. Some submissions are clearly moving toward more operational planning while others retain broader or more aspirational language. While this may indicate differing levels of implementation preparedness reflected in the NDCs themselves, such differences should not be interpreted as a proxy for Parties' actual implementation capacity or readiness, nor as a definitive indication of how digital technologies will be used in practice to advance climate action.

The growing role of digital technologies in climate action also raises questions about whether their increasing prominence as climate enablers is being matched by sufficient visibility of the environmental footprint of the digital sector itself.

Set against this backdrop, the limited attention to greening digital infrastructure and the environmental impacts associated with deploying digital solutions stands out. Only a handful of references across the entire corpus touch on the environmental footprint of ICT systems. As digital technologies become more deeply embedded in climate action, this raises a broader question as to how their associated energy use, greenhouse gas emissions and

other environmental impacts could be more systematically measured and made visible within national climate planning, accounting and reporting, alongside the climate benefits they enable. Internationally recognized methodologies and standards could provide a basis for exploring such approaches. Greater visibility could, in turn, strengthen the evidence available to understand the net contribution of digitalization to climate action and identify opportunities to reduce its environmental footprint.

Annexes

Annex A: Corpus list

Submission date	Party	UNFCCC Annex	Submission
30/07/2026	Oman	Non-Annex I	Oman NDC 3.0
01/07/2026	Guyana	Non-Annex I	Guyana NDC 3.0
24/06/2026	Algeria	Non-Annex I	Algeria NDC 3.0
17/06/2026	Cameroon	Non-Annex I	Cameroon NDC 3.0
09/06/2026	Dominican Republic	Non-Annex I	Dominican Republic NDC 3.0
09/06/2026	Timor-Leste	Non-Annex I	Timor-Leste 3.0
01/06/2026	Benin	Non-Annex I	Benin NDC 3.0
24/04/2026	India	Non-Annex I	India NDC (2031–2035)
30/03/2026	Comoros	Non-Annex I	Comoros NDC 3.0
25/03/2026	Georgia	Non-Annex I	Georgia NDC 3.0
09/03/2026	Central African Republic	Non-Annex I	Central African Republic NDC 3.0
12/02/2026	Congo (Rep. of the)	Non-Annex I	Congo NDC 3.0
29/01/2026	Palau	Non-Annex I	Palau NDC 3.0
26/01/2026	Trinidad and Tobago	Non-Annex I	Trinidad and Tobago Second NDC
21/01/2026	Honduras	Non-Annex I	Honduras NDC 3.0
14/01/2026	Samoa	Non-Annex I	Samoa NDC 3.0
08/01/2026	Nauru	Non-Annex I	Naoero NDC 3.0
31/12/2025	Armenia	Non-Annex I	Armenia NDC 3.0
31/12/2025	Burkina Faso	Non-Annex I	Burkina Faso NDC 3.0
26/12/2025	Republic of Korea	Non-Annex I	The Republic of Korea's 2035 NDC
24/12/2025	El Salvador	Non-Annex I	El Salvador NDC 3.0
24/12/2025	Gabon	Non-Annex I	Gabon NDC 3.0
19/12/2025	Colombia	Non-Annex I	Colombia NDC 3.0
15/12/2025	Zambia	Non-Annex I	Zambia NDC 3.0
09/12/2025	Sierra Leone	Non-Annex I	Sierra Leone NDC 3.0

(continued)

Submission date	Party	UNFCCC Annex	Submission
08/12/2025	Rwanda	Non-Annex I	Rwanda NDC 3.0
01/12/2025	Bahrain	Non-Annex I	Bahrain NDC 3.0
27/11/2025	Panama	Non-Annex I	Panama NDC 3.0
26/11/2025	Kazakhstan	Non-Annex I	Kazakhstan NDC 3.0
17/11/2025	Mexico	Non-Annex I	Mexico NDC 3.0
14/11/2025	Costa Rica	Non-Annex I	Costa Rica NDC 2025–2035
13/11/2025	Iraq	Non-Annex I	Iraq NDC 3.0
11/11/2025	Ukraine	Annex I	Ukraine Second NDC
10/11/2025	Belarus	Annex I	Republic of Belarus NDC for 2026–2035
10/11/2025	Bhutan	Non-Annex I	Bhutan's NDC 3.0 (Provisional)
10/11/2025	Burundi	Non-Annex I	Burundi NDC 3.0
09/11/2025	Türkiye	Annex I	Türkiye Second NDC (NDC 3.0)
07/11/2025	Bahamas	Non-Annex I	Bahamas NDC 3.0
06/11/2025	Peru	Non-Annex I	Peru's Updated Nationally Determined Contribution (NDC 3.0)
06/11/2025	Uzbekistan	Non-Annex I	Uzbekistan NDC 3.0
06/11/2025	Guinea	Non-Annex I	Guinea NDC 3.0
06/11/2025	Fiji	Non-Annex I	Fiji NDC 3.0
06/11/2025	Paraguay	Non-Annex I	Paraguay NDC 3.0
05/11/2025	Austria	Annex I	The NDC of the European Union and its Member States
05/11/2025	Azerbaijan	Non-Annex I	Azerbaijan NDC 3.0
05/11/2025	Belgium	Annex I	The NDC of the European Union and its Member States
05/11/2025	Bulgaria	Annex I	The NDC of the European Union and its Member States
05/11/2025	Croatia	Annex I	The NDC of the European Union and its Member States
05/11/2025	Cyprus	Annex I	The NDC of the European Union and its Member States
05/11/2025	Czechia	Annex I	The NDC of the European Union and its Member States

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Submission date	Party	UNFCCC Annex	Submission
05/11/2025	Denmark	Annex I	The NDC of the European Union and its Member States
05/11/2025	Estonia	Annex I	The NDC of the European Union and its Member States
05/11/2025	European Union	Annex I	The nationally determined contribution of the European Union and its Member States
05/11/2025	Finland	Annex I	The NDC of the European Union and its Member States
05/11/2025	France	Annex I	The NDC of the European Union and its Member States
05/11/2025	Germany	Annex I	The NDC of the European Union and its Member States
05/11/2025	Greece	Annex I	The NDC of the European Union and its Member States
05/11/2025	Hungary	Annex I	The NDC of the European Union and its Member States
05/11/2025	Ireland	Annex I	The NDC of the European Union and its Member States
05/11/2025	Italy	Annex I	The NDC of the European Union and its Member States
05/11/2025	Latvia	Annex I	The NDC of the European Union and its Member States
05/11/2025	Lithuania	Annex I	The NDC of the European Union and its Member States
05/11/2025	Luxembourg	Annex I	The NDC of the European Union and its Member States
05/11/2025	Malta	Annex I	The NDC of the European Union and its Member States
05/11/2025	Mozambique	Non-Annex I	Mozambique's Provisional NDC 3.0
05/11/2025	Netherlands (Kingdom of the)	Annex I	The NDC of the European Union and its Member States
05/11/2025	Poland	Annex I	The NDC of the European Union and its Member States
05/11/2025	Portugal	Annex I	The NDC of the European Union and its Member States
05/11/2025	Romania	Annex I	The NDC of the European Union and its Member States

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Submission date	Party	UNFCCC Annex	Submission
05/11/2025	Slovakia	Annex I	The NDC of the European Union and its Member States
05/11/2025	Slovenia	Annex I	The NDC of the European Union and its Member States
05/11/2025	Spain	Annex I	The NDC of the European Union and its Member States
05/11/2025	Suriname	Non-Annex I	Suriname NDC 3.0
05/11/2025	Sweden	Annex I	The NDC of the European Union and its Member States
04/11/2025	Thailand	Non-Annex I	Thailand NDC 3.0
03/11/2025	China	Non-Annex I	China's 2035 NDC
01/11/2025	Cabo Verde	Non-Annex I	Cabo Verde NDC 3.0
29/10/2025	Côte d'Ivoire	Non-Annex I	Côte d'Ivoire NDC 3.0
28/10/2025	Mauritania	Non-Annex I	Mauritania NDC 3.0
27/10/2025	Indonesia	Non-Annex I	Republic of Indonesia Second NDC
24/10/2025	Malaysia	Non-Annex I	Malaysia NDC 3.0 (2025)
24/10/2025	South Africa	Non-Annex I	South Africa's Second NDC
02/10/2025	Kyrgyzstan	Non-Annex I	Kyrgyzstan NDC 3.0
30/09/2025	Iceland	Annex I	Iceland's NDC 2035
30/09/2025	Lebanon	Non-Annex I	Lebanon NDC 3.0
30/09/2025	Morocco	Non-Annex I	Morocco NDC 3.0
30/09/2025	Panama	Non-Annex I	Declarative NDC 3.0 of Panama
30/09/2025	Sao Tome and Principe	Non-Annex I	Sao Tome and Principe NDC 3.0
30/09/2025	Seychelles	Non-Annex I	Seychelles NDC 3.0
29/09/2025	Bangladesh	Non-Annex I	Bangladesh NDC 3.0
29/09/2025	Bolivia (Plurinational State of)	Non-Annex I	Bolivia NDC 3.0
29/09/2025	Mauritius	Non-Annex I	Mauritius NDC 3.0
29/09/2025	Russian Federation	Annex I	Russian Federation Second NDC

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Submission date	Party	UNFCCC Annex	Submission
26/09/2025	Ethiopia	Non-Annex I	Ethiopia NDC 3.0
26/09/2025	Tuvalu	Non-Annex I	Tuvalu NDC 3.0
25/09/2025	Sri Lanka	Non-Annex I	Sri Lanka NDC 3.0
24/09/2025	Liberia	Non-Annex I	Liberia NDC 3.0
24/09/2025	Micronesia	Non-Annex I	Federated States of Micronesia NDC 3.0
24/09/2025	Mongolia	Non-Annex I	Mongolia NDC 3.0
24/09/2025	Pakistan	Non-Annex I	Pakistan NDC 3.0
24/09/2025	Vanuatu	Non-Annex I	Vanuatu NDC 3.0
23/09/2025	Chile	Non-Annex I	Chile NDC 2025
23/09/2025	Tonga	Non-Annex I	Tonga NDC 3.0
22/09/2025	Eswatini	Non-Annex I	Eswatini NDC 3.0
22/09/2025	Honduras	Non-Annex I	Second Update of the Nationally Determined Contribution
22/09/2025	Jamaica	Non-Annex I	Jamaica NDC 3.0
22/09/2025	Jordan	Non-Annex I	Jordan NDC 3.0
22/09/2025	Nigeria	Non-Annex I	Nigeria NDC 3.0
22/09/2025	Tunisia	Non-Annex I	Tunisian NDC 3.0
19/09/2025	Nicaragua	Non-Annex I	Nicaragua NDC 2025
18/09/2025	Australia	Annex I	Australia's Second NDC
16/09/2025	Brunei Darus-salam	Non-Annex I	Brunei Darussalam NDC 3.0
16/09/2025	Holy See	Non-Annex I	Holy See NDC 2035
13/09/2025	Angola	Non-Annex I	Angola NDC 3.0
12/09/2025	Serbia	Non-Annex I	Serbia NDC 3.0
10/09/2025	Liechtenstein	Annex I	Liechtenstein Second NDC Submis-sion
08/09/2025	Somalia	Non-Annex I	Updated Somalia NDC 3.0
30/08/2025	Barbados	Non-Annex I	Barbados 2025 Second Nationally Determined Contribution
13/08/2025	Solomon Islands	Non-Annex I	Solomon Islands NDC 3.0
08/08/2025	Cambodia	Non-Annex I	Cambodia's NDC 3.0

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Submission date	Party	UNFCCC Annex	Submission
16/07/2025	Monaco	Annex I	Monaco NDC 2025
26/06/2025	Norway	Annex I	Norway NDC 2035
14/06/2025	Belize	Non-Annex I	Belize NDC 3.0 Update
19/05/2025	Nepal (Republic of)	Non-Annex I	Nationally Determined Contribution (NDC) 3.0
06/05/2025	Moldova	Non-Annex I	Republic of Moldova NDC 3.0
30/04/2025	Kenya	Non-Annex I	Kenya's Second Nationally Determined Contribution 2031–2035
27/02/2025	Cuba	Non-Annex I	Cuba NDC 3.0
27/02/2025	Maldives	Non-Annex I	Maldives' Third Nationally Determined Contribution
21/02/2025	Montenegro	Non-Annex I	Montenegro Third NDC
18/02/2025	Japan	Annex I	Japan's 2035/2040 NDC
12/02/2025	Canada	Annex I	Canada's 2035 NDC
10/02/2025	Marshall Islands	Non-Annex I	Marshall Islands Third NDC
10/02/2025	Singapore	Non-Annex I	Singapore Second Nationally Determined Contribution
10/02/2025	Zimbabwe	Non-Annex I	Zimbabwe NDC 3.0 Country Statement
06/02/2025	Ecuador	Non-Annex I	Ecuador Second NDC
06/02/2025	Saint Lucia	Non-Annex I	Saint Lucia Third NDC
05/02/2025	Andorra	Non-Annex I	Andorra Third NDC
31/01/2025	New Zealand	Annex I	New Zealand's Second Nationally Determined Contribution
30/01/2025	United Kingdom	Annex I	The UK's 2035 NDC ICTU
29/01/2025	Switzerland	Annex I	Switzerland Second NDC 2031–2035
30/12/2024	Uruguay	Non-Annex I	Uruguay Third NDC
13/11/2024	Brazil	Non-Annex I	Brazil Second Nationally Determined Contribution
06/11/2024	United Arab Emirates	Non-Annex I	The United Arab Emirates' Third Nationally Determined Contribution (NDC 3.0)
13/06/2024	Panama	Non-Annex I	Panama Second NDC

Annex B: Keyword list and search logic

#	List of keywords	Search logic
1	Digital	"digital"
2	ICT	Abbreviation and stems
3	Technologies	Stem
4	Data	"data"
5	Software	Stem
6	Mobile	"mobile"
7	Mobile apps	Stems and variations ("apps", "applications")
8	Artificial intelligence (AI)	Stem and abbreviation
9	Internet of Things (IoT)	Stem and abbreviation
10	Big data	"big data"
11	Digital twin	"twin"
12	Robotics	Stem
13	Augmented Reality (AR), Virtual Reality (VR), Extended Reality (XR), Metaverse	Stems and abbreviations
14	3D printing	"3D"
15	Comput	Stem
16	Optimization	Stem
17	Telecomm	Stem
18	5G	"5G"
19	Digital infrastructure, digital public infrastructure	Stems
20	Interoperability	Stem
21	Clean energy technology	Stem
22	Energy-efficient technologies (smart grids, smart buildings, smart agriculture)	Stem and "smart"
23	Electric	Stem
24	Space 2.0 technologies + GIS	"Space 2.0" and "GIS" and "Geographic Information Systems"
25	Satellite imagery for monitoring	Stems
26	Remote sensors	Stems and variations (e.g. "télédétection" and "capteurs" in French)
27	Monitoring and verification systems	Stems

(continued)

#	List of keywords	Search logic
28	MRV	Abbreviation
29	Early warning systems	Stem and abbreviation
30	Databases and systems for monitoring of forestry, water, coastal zone, and climate change data	Stems
31	Real-time data analytics	"real-time"
32	Dashboard	"dashboard"
33	Research and innovation	Stem
34	Transfer	Stem
35	Simulation training, virtual labs	Stems
36	E-agriculture, e-commerce, e-learning, e-accessibility, e-mobility	Stems
37	Open data	"open data"
38	Traceability	Stem
39	Divide	"divide"
40	Gender and women	"gender" and "women"
41	Assistive technologies	Stem
42	Green jobs	Stem
43	Just transition	"just" and "transition"

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